Railway Accidents,
reports by Govt. Inspectors,
Nos. 1 to 27
March 1927 to March 1940

00134487

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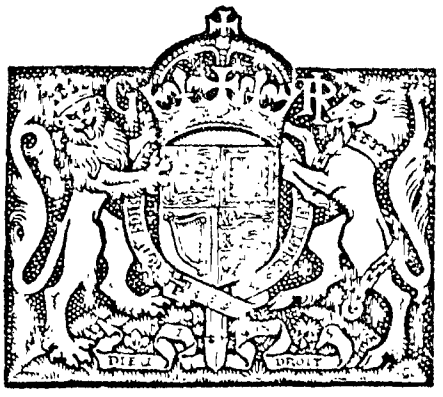

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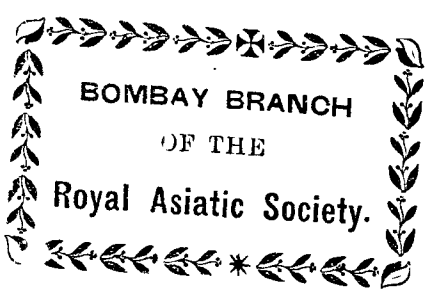
BOMBAY BRANCH
OF THE
Royal Asiatic Society.

134487

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00134487

NORTH WESTERN RAILWAY.

ACCIDENT TO 86 DOWN MAIL TRAIN AT AMRITSAR ON THE 9TH OCTOBER 1926.

Office of the
Senior Government Inspector of Railways,
Circle No. 4, Lahore.

FROM

MR. W. V. BUTCHER,
SENIOR GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE NO. 4, LAHORE.

To

THE SECRETARY,
RAILWAY BOARD,
DELHI.

Dated the 3rd December 1926.

SIR,

In accordance with Rule (7) of Railway Board's Notification No. 120-T.—18, dated 21st March 1923, I submit herewith report of the enquiry held by Mr. H. Dale Green (late Senior Government Inspector) from 11th to 14th October 1926, at Amritsar, into the circumstances attending the derailment of 86 Down Bombay Mail, at Amritsar on the North Western Railway, on 9th October 1926 at 22-55 hours.

2. The following Officers attended the enquiry:—

H. F. Lockwood, Esq., Divisional Superintendent, Lahore.

Lt.-Col. W. Macrae, Deputy Chief Engineer, Special Works, North Western Railway, Lahore.

W. M. Cargill, Signal Engineer, Lahore.

J. S. Goss, Divisional Rolling Stock Officer, Lahore.

B. C. L. Bean, Divisional Transportation Officer, Lahore.

R. P. Varma, Executive Engineer, No. 2.

Sirdar Abdul Hussain Khan, Extra Assistant Commissioner and Magistrate, 1st Class, Amritsar.

Description of Accident.

3. This report deals with the derailment of 86 Down Bombay Mail, at Amritsar, at 22-55 hours on 9th October 1926.

4. When entering Amritsar yard the engine left the track at facing points No. 20 which were correctly set and locked for the turnout to No. 3 platform. The engine and two leading bogie coaches were completely derailed, and the leading wheels of the third bogie coach were also derailed. The second bogie on the train which was an intermediate and third class coach telescoped partly into the leading bogie coach which was a 1st and 2nd class composite.

5. Three passengers (Capt. Spencer Cocks, R.A.M.C., Rifleman Duncan and Mussammat Pritam Kour) were slightly injured, and one passenger (Mr. Gian Singh, Sugar merchant, Amritsar) seriously injured. A travelling ticket examiner was also slightly injured. The Engine crew were uninjured.

6. The train travelled a distance of nearly 300 ft. from the point of derailment before it came to a stand. The engine was canted over to the right and the wheels on that side were embedded nearly up to the foot plate. This clearly indicates that the train was travelling at excessive speed. According to Rules the speed for a turnout at facing points should not have exceeded 10 miles per hour.

7. Remodelling is in progress in Amritsar yard but these points and signals were fully cabin interlocked. The points were correctly set and locked and the signals lowered for admission of the train.

8. The undamaged coaches of the mail train were detached and shunted to the station, and a fresh engine and a composite bogie were attached. The train left for Bombay after a detention of one hour and forty minutes.

Description of the Site of the Accident.

9. The derailment took place at facing points No. 20 in the Down main line at the Lahore end of Amritsar. These points are 1,575 ft. from the centre of the present Down main line platform, No. 3.

10. Amritsar Station Yard is undergoing remodelling and before work was taken in hand the down main line ran straight to the passenger platform at the station building. This passenger platform is being widened and has been temporarily closed for the reception of trains, island platform No. 3 being used instead. When this change was carried out Points No. 20 were put into the main line to give the necessary turnout to No. 3 platform. The portion of the old straight main line from Points No. 20 to the station building was retained temporarily as the only connection with the Engine Shed runs into it with a set of trailing points, and as the line would also be required later for work in connection with the dismantlement and rebuilding of the roof spanning tracks at the station building. The interlocking and signals for the reception of trains were altered temporarily but they continued to be worked from West cabin the direct distance of west cabin from Points No. 20 is 953′-9″. The home signals in use at this point were a high arm for the line to platform No. 3 and a lower arm to platform No. 5. Both signals were on separate brackets on the same post situated 247′ in advance of Points No. 20. Trains to either platforms No. 3 or 5 had to take the turnout at Points 20.

Conclusions.

11. All the evidence shows that the signals were correctly lowered and that Points No. 20 interlocked with them were also correctly set and locked. An examination of points No. 20, and the west cabin after the accident showed that if the switch were gaping even 1/16 of an inch the locking bar could not be worked and the home signal could not be lowered. The points could not therefore have been gaping and there was nothing to show that any wheel could or did pass between the switch and stock rail. The points however were packed with a mixture of ballast and cinders and had not been sufficiently long in the line to be firmly bedded and it was also noticed that at the toe of the switch the track was about 3/16 inch lower than the track 5 ft. in advance. I am therefore of opinion that the derailment occurred by the leading wheels of the engine mounting the switch and stock rail, particularly as the wheels of the coaches took the correct road.

12. The Driver of the train states that he entered the yard cautiously and must have been travelling at any thing from 15 to 20 miles per hour when the accident took place. But taking into consideration that the engine and two leading coaches were completely derailed, also the leading wheels of the third bogie, and that the train travelled a distance of nearly 300 ft. from the point of the derailment, by which time the engine had embedded itself on one side nearly up to the foot-plate, I am of opinion that the speed must have been about 35 miles an hour.

13. The driver contends that it was permissible for him to enter the yard at any speed up to 60 miles per hour for the following reasons :—

(*a*) "The line was governed by the straight line signal" (*i.e.* because the signal arm was higher than the arm on the adjoining bracket).

(*b*) "The line was governed by the Main Line Signal" and he "considered it the Mine Line".

(*c*) "After the interlocking was completed the Caution Order which was given at Cheharta (the adjoining station) restricting the speed to 10 miles per hour was discontinued ".

(*d*) That he considered the cancellation of the above Caution Order also cancelled the rule as far as Amritsar was concerned for the restriction of speed to 10 miles per hour when trains are admitted on any lines other than a straight road at facing points.

The rules referred to by the driver is No. (2) on fly page (II) of the Working Time Table for the Lahore Division and is as follows :—

"At stations where points and signals are interlocked speed of trains admitted to or running through on the straight road is only limited by restrictions noted in paragraphs (*a*) to (*d*) above. At all interlocked stations when trains are admitted on to any other than a straight road, and at all non-interlocked stations (shown underlined in the Working Time Table) the speed of all trains over facing-points must not exceed 10 miles an hour". *Vide* Appendix (*a*) for Rules (1) " Speed " and (2) " Speed over Facing Point " of the Working Time Table, Lahore Division, reproduced in full.

14. As regards (*a*) and (*b*) above General Rule 27 states "Distinction between Signals. Signals on brackets and bridges shall be distinguished as much as possible by grouping and by making the more important signals higher than the less important signals". In the "North Western State Railway Signal Manual issued for the use of Drivers, Station Masters, etc.," it is stated in Chapter I, rule 10, "when a bracket or bridge of signals is used, that signal which refers to the straight road is always placed higher than the others, see (*a*) in fig. 6-A. If all the semaphores are placed at the same height it means that there is no straight entry to the yard and in accordance with the rule that cross-overs or turnouts are not to be taken at more than 10 miles an hour, the Driver should slow down—where the higher arm [see (*a*) in fig. 6-A.] is lowered the driver may enter at speed unless specially instructed not to do so"—This point is further emphasized in Chapter II paragraph 2 under the heading "The Routing Bracket Signal"—This signal manual which bears no authority for its publication was issued in 1910. It seems that only a few copies are still in possession of the staff. The rules quoted are still worked to in all cases as regards intermediate crossing stations where the higher arm of bracketed signals invariably relates to the "straight" or "main line" and over which trains may proceed without restriction of speed over interlocked points, but at junction stations the higher arm does not in all cases relate to roads without turnouts. This lack of strict uniformity is misleading unless such departures from the principle followed are specially brought to the notice of the staff in the working time table. The contention of the Driver that the signal was misleading is therefore correct.

15. As regards (*c*) and (*d*) above. The Station Superintendent, Amritsar, on 24th September 1926 issued a message No. 81-R. to all the railway officials concerned "No. 3 line brought into use from 8-30 as a caution order to be issued to all drivers of Down Trains to restrict speed to 5 miles an hour over points No. 20 opposite high service water tank in Amritsar Station Yard

till further orders. Permanent Way Inspector, Amritsar, will remove restriction—Trains will work on signals''. The Permanent Way Inspector, Amritsar, in his wire No. O. T.—233, dated the 28th September 1926, removed the restriction. As the restriction which was imposed and removed was that of 5 miles per hour when it was removed, the restriction of speed to 10 miles an hour when trains are admitted on to any other than a straight road came into force. [*Vide* appendix A, Rule 2.] The contention of the driver that he could enter the yard at any speed up to 60 miles per hour is therefore, incorrect. As he admits that he knew the road and that he had to take the turnout at points No. 20, he should have exercised greater caution and reduced speed to 10 miles per hour.

16. It is necessary to point out here that on fly leaf page (IX) of the Working Time Table there are ''Running Notes and Special Restrictions of Speed''. In these restrictions which are imposed where necessary by the Engineering Department there is a restriction against ''Over facing points at Amritsar'' which is as follows—''10 miles an hour when up trains enter on lines other than up main passenger lines, and when down trains enter other than down main passenger lines''. The wording is such that it authorizes a driver entering any main passenger line to travel at a speed exceeding 10 miles an hour and it therefore conflicts with rule (2) for ''Speed over Facing Points'' on fly leaf page (ii) for any main passenger lines with turnouts.

17. Considering the extensive nature of the remodelling being carried out at the up end of Amritsar yard, and the large number of workmen including coolies and donkeys employed on the extension of the platform, I am of opinion that a restriction of speed to 10 miles an hour for all Down trains entering the yard should have been imposed.

18. In the evidence of Mr. Harrer, Permanent Way Inspector, it is stated that a broken cast iron treadle bar clamp was found a short distance ahead of the point of derailment. This treadle bar clamp shows no mark or signs of having any connection with the derailment. I attach no importance whatever to this bit of evidence.

19. The wheel flanges of the engine were examined. There were no indications of worn or sharp flanges.

20. Finally as regards the cause of the accident I am of opinion that it was due to the Driver travelling at excessive speed when taking the turnout at points No. 20, which were not truly level and had not been sufficiently long in the line to be firmly packed and bedded.

21. I accept the Driver's contention that the signal was misleading but at the same time as he knew the road and that he had to take the turnout at points No. 20, he should therefore have exercised greater care and judgment and known that Rule 2 of the Working Time Table restricted the speed to 10 miles per hour and reduced speed accordingly.

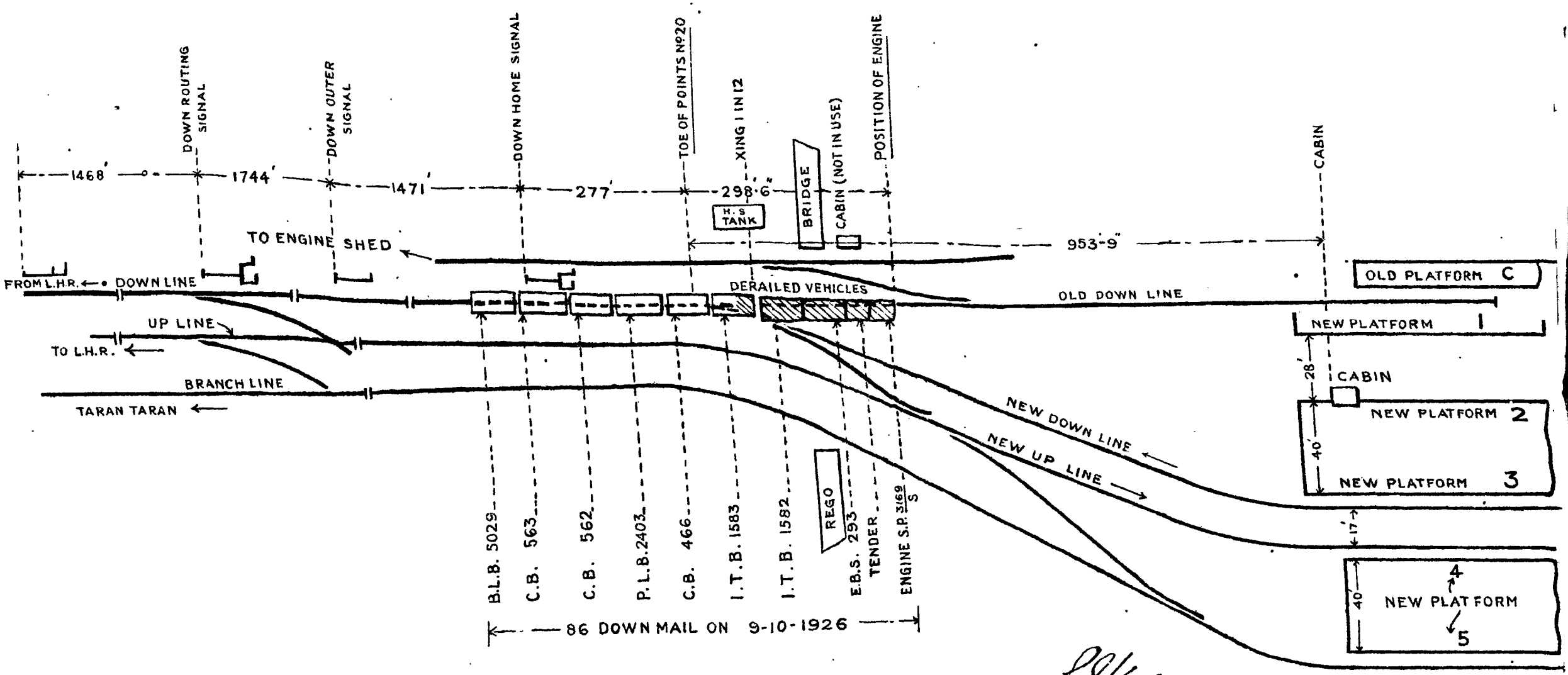
Yours faithfully,

W. V. BUTCHER,
Senior Government Inspector.

D. A.—

(1) Rules regarding ''Speed'' and ''Speeds over Facing Points''.

ROUGH SKETCH SHOWING POSITION OF DERAILMENT OF 86 DOWN MAIL OCCURRED ON 9TH OCTOBER 1926 @ 22·55 AT AMRITSAR



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APPENDIX A.

Rules regarding Speed and Speed over Facing Points.

1. *Speed.*—Any restriction of speed or other instructions noted in the Working Instructions or in the Working Time Table, or notified from time to time by special advice or in the Weekly Gazette, must be strictly observed.

(*a*) Unless instructions not to exceed a lower speed are shown in the Working Time Table the Speed of mail and other trains fitted with the automatic-brake throughout the train must not ex-exceed 60 miles an hour, and the speed of all other trains must not exceed 30 miles an hour.

(*b*) The speed of passenger or mixed trains running with engines tender foremost is not to exceed 15 miles an hour, or such higher speed, not exceeding 25 miles an hour, as may be specially authorised.

(*c*) The speed of goods and ballast trains running with engines tender foremost is not to exceed 25 miles an hour, except where instructions not to exceed a lower speed are shown at the foot of the Working Time Table or in other special instructions.

(*d*) These maxima apply also to light engines when running tender foremost.

2. *Speed over facing Points.*—At stations where points and signals are interlocked, the speed of trains admitted to, or running through, on the straight road is only limited by restrictions noted in paragraphs (*a*) to (*d*) above. At all interlocked stations when trains are admitted on to any line other than a straight road, and at all non-interlocked stations (shown underlined in the Working Time Table), the speed of all trains over facing-points must not exceed 10 miles an hour.

(*a*) The speed of trains through stations where the main line is not isolated is restricted to 30 miles an hour.

MADRAS AND SOUTHERN MAHRATTA RAILWAY.

ACCIDENT TO 93 UP GOODS TRAIN OVER MALAPRABHA BRIDGE ON THE 5TH NOVEMBER 1926.

No. 26/383.

Office of the
Senior Government Inspector of Railways,
Circle No. 7.

To

THE SECRETARY,
RAILWAY BOARD,
DELHI.

Dated Ootacamund, the 31st January 1927.

SIR,

I have the honour to forward my report on the accident to 93 Up Goods at the Malaprabha bridge near Khanapur (Londa-Belgaum Section), Madras and Southern Mahratta Railway, which occurred on 5th November 1926.

Previous correspondence is my telegram 69-G. of 6th November 1926, and my letter No. 26/383, dated 12th November 1926.

This, the final report, has been delayed as some of the witnesses thinking they would be inculpated concocted an unnecessary and false story to cover any blame that might be imputed to them, and I arranged with the police to make further investigations. The police, however, while agreeing that false evidence had been given, were not able to extract sufficient proof to convict, and their report did not reach me until the 19th instant while I was on tour.

The accident was not one that called for the Government Inspector's investigation, but I was induced to hold an enquiry myself owing to one or two accident of a similar nature having occurred lately in which the actual cause of the accident has remained doubtful.

I have the honour to be,

SIR,

Your most obedient servant,

H. E. C. COWIE,
Senior Government Inspector.

Report on the accident to 93 Up Goods at the Malaprabha Bridge near Khanapur (Londa-Belgaum Section), Madras and Southern Mahratta Railway, on 5th November 1926.

Brief Description.

93 Up Goods left Hubli at 15-35 hours on November 4th, 1926. Shunting was carried out at Amargol, Dharwar, Alnavar and Londa. It left Gunji, mile 8½, at 0-47 hours composed as follows :—

Serial No.	Type of Wagon.	Number of wagon.	Four or eight wheeler.	Load.	Actual Load.	Carrying capacity.	Examination dates.	Gross load.	Tare.	Remarks.
Engine	G. S.	No. 410						Tons.	T. Cwt.	
1	H. W.	4685	4 wheeler	Loaded	...	...	.....	8	...	
2	M. C. I.	11292	„	Coal	...	...	.....	15	...	
3	P. T. L.	8475	„	Bamboos	...	...	.....	13	...	
4	C. G.	3595	„	General goods 548 Packages.	...	...	.....	7	...	
5	C. G. N.	4411	„	Grain 95 bags of Jowri	237 mds.	11¼ Tons.	.....	14	4 8	
6	C. G.	206	4 wheeler 8′ wheel base	Jowri 48 bags	129 mds.	190 mds.	P. 5-5-26 R. U. B. L. 4-11-26 O. U. B. L. 4-11-26	11	3 13	
7	C. G.	8298	4 wheeler 8′ wheel base.	Jowri 63 bags	6 Tons.	...	P. D. M. M. 14-5-25 R. B. G. M. 18-5-26 O. G. D. G. 9-10-26	10	4 0	
8	C. G. N.	6560	4 wheeler 9′ wheel base.	Jowri and wheat 85 bags.	8 Tons.	...	P. U. B. L. 4-12-25 R. N. D. L. 11-10-26 O. G. T. L. 29-10-26	16	8 0	135 Tons.
9	G. G.	303	4 wheeler 8′ wheel base.	Coal	T. Cwt. 6 19	...	P. 21-7-25 R. U. B. L. 9-10-26 O. N. D. L. 26-10-26	11	3 0	
10	C. G.	438	4 wheeler 8′ wheel base.	Copra 100 bags	3 Tons.	...	P. U. B. L. 11-7-26 R. U. B. L. 14-7-26 O. U. B. L. 4-11-26	7	...	
11	M. A. I.	10088	4 wheeler 10′ wheel base.	Pressed cotton 50 bales	151 mds.	...	P. H. S. 22-6-25 R. G. D. G. 25-8-26 O. B. G. M. 22-10-26	14	8 0	
12	C. G.	3032	4 wheeler 8′ wheel base.	Jowri 58 bags	6 Tons.	...	P. H. S. 23-6-25 R. C. L. R. 18-6-25 O. G. D. G. 24-10-26	9	3 0	
13 and 14	Two	wagons	...	...	...	...	.....	11	...	Underguard
15	B. V. G.	...	...	...	...	...	.....			
16 to 34	Nineteen	wagons.	...	...	...	...	.....			
35	B. V. G.	...	...	...	...	...	.....	16	...	Guard

256 Tons.

All wagons and brakes non-vacuum Engine and tender Vacuum braked. 135 Tons.

When nearing the Malaprabha bridge mile 15/2 at about 1-30 it appears an axle box of wagon 8298 broke and this wagon derailed 5′ 9″ inside the end of the coping of the bridge abutment. The sleepers showed that other wagons derailed between this point and the end post of the 100′ girder. 8298 struck the end post of the 100′ girder on the right side (looking towards Khanapur) jammed across the bridge a few feet farther on. The engine with the first five wagons and No. 206 with rear wheels derailed shot on a distance of 416 feet before stopping. 6560, 303, 438 and 10088 capsized and bunched on to 8298. 3032 derailed. The remaining wagons serial numbers 13 to 35 remained on the rails being subsequently removed on their own wheels to Gunji. The engine and the 6 leading wagons also ran on their own wheels to Khanapur after the rear wheels of 206 were rerailed.

Nobody was injured; the Castle Rock relief train arrived at 8-30 at the south end, and the Belgaum train at Khanapur at 5-50. The District Traffic Superintendent was on the spot at 6 hours; through communication was restored at 15-30 hours.

The line from Gunji is up and down as far as mile 14/6. At 14/8 a 1 in 100 falling gradient starts and ends at 14/17½ from which point to the bridge and across the bridge the track is on the level, so that there is 1760′ of level before reaching the bridge. There is a deep cutting from 14/3 to 14/16 and a driver gets a clear view of the Khanapur Up outer at 14/17, though perhaps on account of the ourve the signal light at night would not focus on him until 14/18 or 14/19.

The track is 50 lb. FF. 30′ rails on 11 wooden sleepers with deep flanged fish plates and 4 bolts.

Conclusions.

From the driver's evidence who found an axle box, a spring brass and cotton waste 10 yards to the south of the end of the coping and from the marks of derailments which began 5′ 9″ to the north, it is, I think, clear that a broken axle box was the direct cause of the accident. What caused the axle box to break must remain a mystery. There is nothing to show that the driver applied his brakes suddenly. The Up outer signal was against him. the rule being that when shunting is to be done in the brewery siding the up outer signal must not be taken off until the train has come to a stand; warning is generally given at Gunji when shunting has to be done at the brewery siding and on this occasion it was not given, but there is nothing to show that the speed was in any way excessive.

The box found by the driver has been indentified as belonging to wagon 8298. This wagon has shoe bearing springs so also wagons 206, 303, 438 and 3032, and this accident must increase the unpopularity of this already condemned type.

The District Traffic Superintendent and I examined the sealed cards together and could not find any case of overload. After the accident uneven loading was impossible to detect.

The story of broken wagon parts in the cutting at 14/10 must be taken as a pure fabrication. The story was started by witness No. 9, by name Pasco, the gang mate, and the two bridge chowkidars were in league with him. The police who made certain investigations at my request agree that the story is false, but were unable to obtain sufficient evidence to convict the men. The story was unnecessary as I saw no indications that the derailment was due to the track and the fact that the engine and 6 vehicles passed over the spot safely is proof that nothing much was wrong. The rear wheels of 206 were derailed, I consider, when 8298 jammed up against the bridge girders. The end plate of 8298 was hanging on to the chains of 206, though the draw bar of this latter wagon was broken.

NOTICE.

Please fill in the acknowledgment card below and return it to the Secretary,
Railway Board,
Simla.
at an early date.

If an acknowledgment is not received **it will be assumed that the publication is of no value to you** and your name will be removed from the Distribution List.

My recommendations are as follows:—

(1) That all shoe bearing springs should be eliminated as soon as possible.

(2) That the gangman Pasco be severely punished for not proceeding to the spot on first news of the accident and for giving false evidence.

(3) That the bridge chowkidars be suitably punished for giving false evidence.

Yours faithfully,

H. E. C. COWIE,
Senior Government Inspector.

EAST INDIAN RAILWAY.

ACCIDENT TO 89 UP PASSENGER TRAIN AT GATE LODGE, NO. 87, MILE 100, NEAR ALIGARH, ON THE 22ND NOVEMBER 1926.

No. 1271.

FROM

LT.-COL. C. J. CLARKE, D.S.O.,

SENIOR GOVERNMENT INSPECTOR OF RAILWAYS,

CIRCLE NO. 1, CALCUTTA.

To

THE SECRETARY,

RAILWAY BOARD,

DELHI.

Dated the 9th December 1926.

Collision between No. 89, Up Passenger train and a Camel cart at Gate Lodge No. 87, Mile 100, near Aligarh, on the 22nd November 1926.

DEAR SIR,

In continuation of my telegram No. 1201, dated the 23rd November 1926, I beg to forward herewith a report of enquiry into the above accident together with my remarks thereon.

Yours faithfully,

C. J. CLARKE,
Lt.-Col.,
Senior Government Inspector.

D. A.—

Report referred to.

No. 482-T.

FROM

MR. R R. BYRON,
DEPUTY SENIOR GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE NO. 1, LUCKNOW.

To

THE SECRETARY,
RAILWAY BOARD,
RAISINA, DELHI.

(Through the Senior Government Inspector of Railways, Circle No. 1, Calcutta.)

Dated Lucknow, the 29th November 1926.

DEAR SIR,

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of the enquiry held by me into the circumstances attending the collision of 89 Up Passenger train *ex.* Aligarh to Bareilly, with a camel cart at Level crossing No. 87—Aligarh-Bareilly Branch.

2. I held my enquiry at Aligarh on 24th November 1926, in the presence of the following Officers:—

Mr. G. C. A. Cox, Superintendent of Works, E. I. Railway, Moradabad.

Mr. H. M. Kitchen, Assistant Superintendent, Transportation, E. I. Railway, Moradabad.

Mr. D. Bell, Superintendent, Power, E. I. Railway, Moradabad.

Mr. Sheo Prasad, Railway Magistrate.

Mr. C. E. Cearns, Divisional Inspector, Government Railway Police.

Description of Accident.

3. At about 1-15 on the morning of 22nd November, No. 89 Up Passenger while proceeding from Aligarh to Bareilly ran into a camel cart, containing twelve passengers, on level crossing at gate No. 87, mile 100. As a result of the collision four of the occupants of the cart were killed outright and eight were seriously injured, two of whom subsequently died in hospital. The cart was completely destroyed.

None of the train crew or passengers were injured. With the exception of trifling damage to the cow catcher and buffer lamp of the locomotive, there was no damage either to rolling-stock or permanent-way. The injured persons were picked up and placed in the train which was then backed into Aligarh where the injured persons were sent to hospital. After the necessary reports had been made the train was restarted on its journey.

Description of the Locality of the Accident.

4. The accident occurred on Level crossing No. 87 which is situated at mile 100 about $3\frac{1}{2}$ miles out of Aligarh. The line is straight for more than a mile on either side of the crossing.

There are no steep gradients in the vicinity of the crossing.

The gate lodge is situated on the right hand side of the track when proceeding in the Up direction. This is a second class crossing equipped with double iron gates which are coupled to open and close across the road and not across the track.

Two lamps are provided one on the right hand pair of gates and one on the left hand pair of gates to show green to an approaching train when gates are closed across the road and red when the gates are open for road traffic. The lamp on the right hand pair of gates is obscured from approaching up trains by the gate lodge. But the lamp on the left hand pair of gates can be seen from a distance of at least half a mile. Chains and padlocks are supplied for securing the gates.

Conclusions.

5. The accident was due to the gates being open to the road and the absence of the lamps.

The gate-keeper Gafoor admitted that he left the gates unattended during the night, that he did not light and place the lamps in position for fear they would be stolen in his absence. He did not lock the gates because the keys supplied to him did not fit the locks.

This man is being prosecuted by the police; although Gafoor is primarily responsible for the accident, there is contributary negligence on the part of the Parmanent-Way Staff. He was not the permanent gate-keeper but a gangman who had recently been placed in charge of the gate. It is admitted that he reported to the gang mate that the keys supplied to him did not fit the locks. The gang mate reported the matter to the sub-platelayer who seems to have taken no action. Unfortunately the sub-platelayer was not available to give evidence, being away sick at the time. Had the gateman been able to lock his gates before leaving, the accident could not have occurred but road traffic would have been obstructed.

This being a " second class gate " there should have been two gatemen, but for some reason, which was not discovered at the enquiry, one gateman was withdrawn some months ago and although the Permanent-Way Inspector had asked for another man from 1st September sanction to appoint him was not received until 5th November and even then he was not appointed until after the accident. The Permanent-Way Inspector's explanation that this was due to the absence of the Sub-Plate Layer is not satisfactory.

I am also of the opinion that the Driver, Husain Bux, was not keeping as sharp a look out as he should have been. His statement, that he shut off steam about half a mile from the gate, and that on approaching the crossing he applied his " vacuum " and stopped his train when the engine and one coach only had passed the gate, is not borne out by the evidence which shows that brakes were suddenly applied and the whole train passed over the crossing before coming to a standstill. A dead body was taken out from underneath the rear brakevan which was nearly 100 feet beyond the crossing after the train came to a standstill which tends to prove that he did not see the obstruction until just before the collision. It was a bright moonlight night and nothing to obscure the view and the fact that the cart involved in the accident was the last of three carts to cross the line also tends to prove a sharp look out was not being kept. He cannot be wholly exonerated even though the gate lamps were not lit.

No blame whatsoever can be attached to the camel cart driver who found the gate open and nothing to indicate to him that a train was approaching.

Recommendations.

6. All second class gate lodges should be immediately provided with two men. It is unreasonable to expect any man to be continuously present for twenty-four hours every day at his gate.

The provision of searchlights on engines of all trains.

Yours faithfully,

R. R. BYRON,

Deputy Senior Government Inspector.

Remarks by the Senior Government Inspector.

I agree with the conclusions and recommendations of the Deputy Senior Government Inspector.

Yours faithfully,

C. J. CLARKE,
LT.-COL.,
Senior Government Inspector.

BENGAL-NAGPUR RAILWAY.

ACCIDENT TO 4 UP MADRAS MAIL TRAIN AT BHADRAK ON THE 13TH MARCH 1927.

FROM

LT.-COL. C. J. CLARKE, D.S.O.,
SENIOR GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE NO. 1, CALCUTTA.

TO

THE SECRETARY,
RAILWAY BOARD,
SIMLA.

Dated the 5th April 1927.

SIR,

1. In accordance with Rule (7) of Railway Board's Notification No. 120-T./18, dated 21st March 1923, I submit herewith my report on the enquiry into the circumstances attending the collision of 4 Up Madras Mail and a shunting engine attached to wagons at Bhadrak station on 13th March 1927.

2. I left Calcutta by special train at 9 hours on the 14th March and arrived at the site of the accident at 13 hours. All seriously injured persons had been removed to Hospital at Khargpur and only a few slightly injured remained at the station. Immediately on arrival, I examined the facing points and found them in order with no sign of damage, leaving no doubt that they were set for the turn out to the Goods Lines instead of for the straight and wrong setting of points was the cause of the accident. An investigation had been made by the police before my arrival as a result of which three members of the station staff had been taken into custody. The statements taken in this connection were read but I decided to take the evidence over again and accordingly held an enquiry at which the following were present:—

Mr. L. Greenham, Agent, Bengal-Nagpur Railway.
Mr. V. E. D. Jarrad, Transportation Manager, Bengal-Nagpur Railway.
Mr. C. E. Chase, Superintendent, Running Section, Bengal-Nagpur Railway.
Mr. R. D. T. Alexander, Chief Engineer, Bengal-Nagpur Railway.
Mr. F. R. Ezechiel, Deputy Inspector General of Police.
Mr. W. Magraths, Superintendent, Government Railway Police, Khargpur.
Mr. J. Johnston, District Magistrate, Balasore.
Mr. D. Leslie, Superintendent, Maintenance, Bengal-Nagpur Railway.
Mr. C. V. N. Shortland, District Engineer, Khargpur, Bengal-Nagpur Railway.

3. *Description of the Locality of the Accident.*—Bhadrak is a station on the East Coast Section of the Bengal-Nagpur Railway, 183 miles south of Calcutta. Approaching Bhadrak from Markona, the next station 8⅓ miles distant on the North, signals, consisting of a single Home at the points and, 1,730 feet from them, an outer with a fixed Warner beneath it, are clearly visible. Traversing the Main Line (No. 2), which runs straight through the station the first points encountered are the facing points of the gathering line of three goods lines, Nos. 3, 4, 5, which take off to the *right;* the second points, 223 feet further on, are the facing points of the cross-over leading to the Platform Line No. 1, to the left. The Centre of the platform is 1,290 feet from the first facing points and the total length of the station is 2,540 feet between facing points.

4. *Description of the Working of the Station.*—There is no interlocking between signals and points which are secured with padlocks only. Working is by the Badge System, which has been in force for many years. The object of this system is to prevent verbal orders from being misunderstood. The Assistant Station Master on duty keeps in a lock-up case a Badge for each line with the number engraved on it in English and in Vernacular. The Points Locker on duty is provided with Line Clear Badge bearing a legend in English and in Vernacular indicating that the line is clear and points locked. There are four such Badges of different shapes for Inwards and Outwards trains. When Line Clear is given for an incoming train the Assistant Station Master on duty personally instructs the Points Locker of the line on which the train is to be admitted, and at the same time gives him the Badge bearing the number of the Line. The Points Locker then warns all the staff concerned, locks the necessary points and makes over to the Assistant Station Master the proper Line Clear Badge applying to the train for which the points have been locked. The Points Locker, after parting with the Line Clear Badge, is held personally responsible for seeing that the lines are kept clear till the train has been admitted. The Assistant Station Master also retains in his possession two Shunting Badges. One authorising the shunting engine driver to shunt, and one "Stop Shunting" badge.

5. *Description of the Accident.*—On the night of the 13th March 1927, 6 Up Puri Passenger was received at Bhadrak on the platform line (No. 1) at 21-54 and the train left at 22-7. Markona asked Line Clear from Bhadrak for 4 Up Madras Mail at 21-58 and Line Clear was given at 22 hours. The train ran through Markona at 22-18, and at 22-30 at Bhadrak collided with a shunting engine (tender foremost attached to wagons on Goods Line No. 5 at a point 575 feet from the facing points. The composition of the 4 Up was one luggage van, 7 bogie vehicles, and two horse boxes. The luggage van, the whole of the body of the second vehicle, and half the body of the third both 3rd class carriages, were smashed to pieces in the telescoping that followed the collision and one Upper Class Composite carriage was derailed. 14 passengers were killed and 66 injured. One Pointsman, standing near the shunting engine was killed, the Drivers of both engines and one fireman were injured. The damage done to rolling stock is estimated at Rs. 75,000 approximately. Shortly after the accident the points were found set and locked for the correct line.

Conclusions.

6. The Assistant Station Master, T. R. Soori, relied on having the correct badge in his possession, and on receiving correct hand signals from the points before lowering signals. He stated at first that badges were not exchanged with the Points Locker between the arrival of the 6 Up and 4 Up. He subsequently withdrew this and said that badges were exchanged for the 6 Up, and again for the 4 Up, when the Points Locker was returning from the trailing points after despatching the 6 Up, *i.e.*, before the Points Locker had been again to the facing points. I consider that he was justified according to the Rules in assuming that the points were correctly set when he held the correct badge, but whichever of the two statements is correct regarding the exchange of badges the procedure was irregular and should not have been allowed.

7. The Points Locker, K. Surya Narayana, stated that after receiving the 6 Up on the platform line No. 1 he did not alter the points for the 4 Up. He admitted having received the badge ordering him to lock points for No. 1 line and further stated that after seeing the points set and locked for No. 1 line, he had handed the Line Clear Badge to the Assistant Station Master. He admitted his responsibility for keeping the points locked till the arrival of the 4 Up and said he was quite sure he did so and made no mistake. He evidently thought the points were correctly set. After passing the 6 Up he may have altered them himself and forgotten, or given the keys to some one else who altered them. In either case he was responsible.

8. The evidence as to whether any shunting took place between the arrival of the 6 Up and 4 Up was not conclusive. All the station staff denied that there was any shunting except Vasir, a Khalasi on the shunting engine, who stated that shunting had been performed for 10 minutes after the arrival of the 6 Up. The Loco. Foreman thought from the position of the lever on the shunting engine, inspected shortly after the accident, that there had been shunting, and I think it probable that there was over points No. 2, or if none actually took place that there was an intention to shunt, which would account for the points being set for line No. 5 on which the shunting engine was working.

On the question of how points No. 2 were found set and locked for the correct line immediately after the accident the Guard of the mail train stated that he had seen a man in a long blue coat locking the points with a padlock but the man ran away and he was unable to identify him as the Points Locker or any other member of the staff.

9. As regards the speed of the 4 Up, I am of opinion from the damage done to the engines that it was about 25 miles an hour at the point of impact. The estimate of the speed when passing over the facing points as given by the train staff varied from 10 to 15 miles an hour. It is difficult to state what the actual speed was but there is no doubt it was considerably higher than the 10 miles laid down for un-interlocked stations. The Driver was badly served in being switched to the right when he was expecting to take the second cross over to the left, 223 feet further on, and come to a stand at the station platform, which he would have done safely even if the speed had been 30 miles at the first points.

10. I am of opinion that the wrong setting of facing points No. 2 was the cause of the accident, and for this, Points Locker Surya Narayana was responsible.

11. I consider also that the Assistant Station Master, T. R. Soori, is to blame to some extent for allowing an irregularity in the exchange of badges, a thing about which he should have been most careful.

Recommendations.

12. (*a*) The remodelling of Bhadrak Station, which has been under consideration for some time, should be expedited and should include the isolation of the Passenger Lines from the Goods.

(*b*) The observance of the 10-mile restriction, which is the principal safeguard at un-interlocked stations, should be more rigidly enforced at all such stations.

Yours faithfully,

C. J. CLARKE,

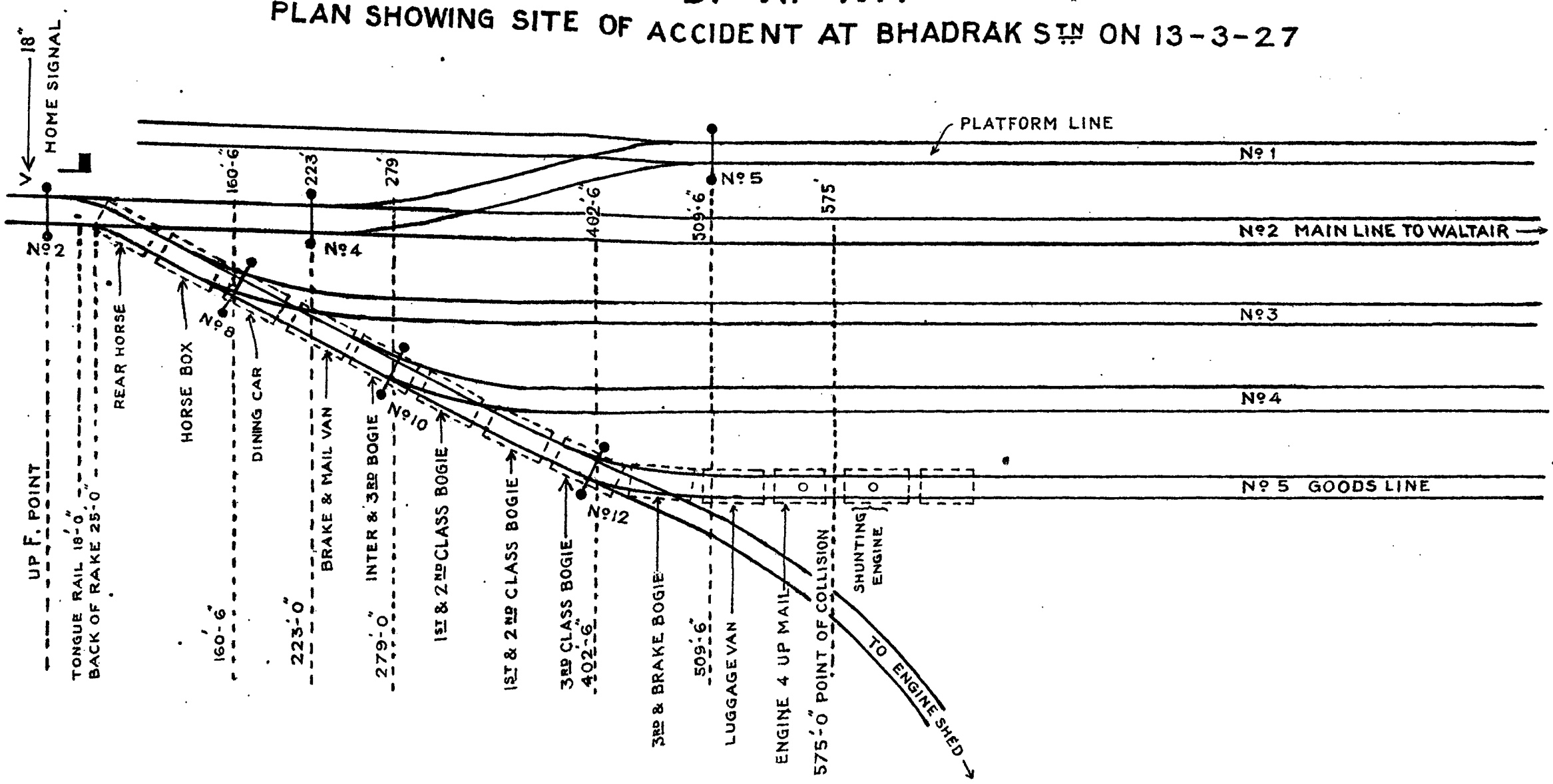
LT.-COL.,

Senior Government Inspector.

GIPD—L 11RB—4-7-27—650.

B. N. RY.

PLAN SHOWING SITE OF ACCIDENT AT BHADRAK STN ON 13-3-27



Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into Accidents

Which occurred during the

Half-year ending the 31st October 1927

No. 2

Issued by the Government of India
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BURMA RAILWAYS.

COLLISION BETWEEN No. 34 DOWN MIXED TRAIN AND AN EMPTY PASSENGER TRAIN AT RANGOON ON THE 18TH MAY 1927.

FROM

MR. E. L. MANLEY,
GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE No. II-A, BURMA,

TO

THE SECRETARY,
RAILWAY BOARD,
DELHI.

Dated the 4th July 1927.

SIR,

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of a railway officers' joint enquiry (at which I was unavoidably prevented from being present) held to investigate the circumstances attending the collision between No. 34 Down Mixed train and an empty rake of bogie passenger coaches in Rangoon Station Yard on 18th May 1927.

2. The following attended the enquiry which was held at Rangoon on 23rd May 1927 :—

Mr. W. Sparke, District Engineer, Burma Railways, Rangoon.

Mr. L. A. Leapingwell, District Traffic Superintendent, Burma Railways, Rangoon.

Mr. J. D. Lewis, Assistant Locomotive Superintendent, Burma Railways, Rangoon.

Mr. R. S. P. Naidu, Signal Inspector, Officiating Signal Engineer, Burma Railways.

Mg. Ba. Thein, Inspector of Railway Police.

Description of the accident.

3. On 18th May 1927 at 18-45 hours while No. 34 Down Mixed train was being admitted on to No. 2 Road in Rangoon Station an empty local rake of 8 bogie coaches was backed by a shunting engine from No. 6 Road and side collided with 34 Down Mixed train. As a result of the collision five passengers were injured, two grievously and three slightly. The total damage is estimated to amount to Rs. 38,535 in the case of rolling stock, Rs. 75 in the case of interlocking gear and Rs. 300 in the case of permanent-way.

4. The empty rake concerned in this accident was that of B. 10 Down local which had arrived on the West half of No. 5 road, from Pagoda Road Station, at 17-52 hours. This rake stables in Rangoon for the night. About half an hour later the Assistant Station Master Mr. Foxwell 'phoned from the Central Cabin to Mr. D'Mello the Officiating Deputy Station Superintendent that he was in difficulties regarding the reception of trains there being no line on which to receive F. 20 Down from the East Side. By this time that is at about 18-27 hours the empty stock of B. 10 Down had been shunted *via* cross-over No. 29-29 to the West end of No. 6 road, to make room for the reception of H. 6 Down local from the West side on No. 5 road. 34 Down was on line clear from Pazundaung and the roads were occupied as follows :—

On No. 1 road was F. 18 Down.

No. 2 road was clear for reception of 34 Down.

On No. 3 road was H. 7 Up.
On No. 4 road was E. 25 Up.
On No. 5 road was H. 6 local rake.
On No. 6 road was B. 10 local rake.

The shunting engine was on the West end of B. 10 rake, facing westwards.

5. The due time for arrival of 34 Down at Rangoon is 18-15 hours. It was thus running late. It was being followed by F. 20 Down for which the due time of arrival at Rangoon is 18-43 hours. No. 2 Down Express, of which the due time of arrival at Rangoon is 18-38 hours was behind this local.

6. After consulting Mr. D'Mello, who had proceeded to the Central Cabin Mr. Foxwell gave orders to Mahabir Singh (Shunting Porter one year's service) in the presence of Mr. D'Mello to back B. 10 Down rake from No. 6 road West end to No. 6 road East end just clear of cross over 29-29 so that F. 20 Down local could be admitted on to No. 5 line (See para. 17 below), and pointed out to the shunting porter where the engine was to stand.

7. The shunt was then carried out but proceeding too far the empty rake was brought to a standstill by side colliding with the stock of 34 Down.

8. Two bogie third class carriages of the Mixed train were capsized one being completely wrecked.

9. The injured with one exception received very prompt medical treatment and were immediately conveyed by motor ambulance to Rangoon General Hospital. The exception was a Burman who received a simple hurt and only reported at the Insein Hospital on the following day.

Description of the locality of the accident.

10. The site of the collision was close to the crossing at the junction of No. 6 road and the Down passenger main line from Pazundaung leading to lines 2 and 4.

11. There are Up and Down passenger main lines at both ends of Rangoon Station. The adjoining station on the West side is Pagoda Road and that on the East side is Pazundaung.

12. The main passenger platform is served by line No. 1 and between roads 2 and 3 and between roads 4 and 5 are island passenger platforms. (Between roads Nos. 6 and 7 is a similar island platform but it has only recently been constructed and has not yet been brought into use.)

13. The Yard is interlocked. Signalling has been provided for the admission of Down passenger trains from Pazundaung to lines 1, 2, 4, 5 and 6. Also for the admission of Down passenger trains from the West side to lines 1, 3 and 5. Platform starters and shunt out signals are provided at the East end of lines 1, 2, 3, 4, 5 and at the West end of lines 1, 2, 3, 4, 5 and 6.

14. Line No. 6 was formerly a double dead end with one cross over in the middle but in March 1913 the Traffic Department represented that " it happens fairly frequently that all the platform lines and the one through goods line on which it is possible to receive engines and trains from Pazundaung are occupied and light engines and trains have in consequence to be detained at Pazundaung ". To avoid such detentions and to enable more use to be got out of No. 6 line it was then converted into a through road and signalled for incoming trains from Pazundaung and outgoing trains to the West side. Router signal No. 16 for No. 6 road was therefore added to the signal gantry at the East end and a Starter and Shunt Out signal at the West end, also the corresponding Down home signals namely No. 5 for Down goods and Locos. and No. 2 for the Down passenger line from the East side were made to apply to No. 6 road as well as Nos. 2 and 4 roads.

15. In the printed working instructions it is laid down that Down passenger trains from the Mandalay line (*i.e.*, from the East side of the Yard) can be received at Platforms 1, 2, 4 or 5 only.

16. The points and signals of the station are worked from three cabins called East, West and Central Cabins. All signals referring to passenger trains are operated by either the East or the West Cabin, as the case may be, and all these signals are controlled by the Central Cabin under the supervision of an Assistant Station Master, without whose consent and co-operation no signal for trains going to or from the passenger lines can be lowered.

17. Between lines 5 and 6 there is a cross over 29-29 which is worked by the Central Cabin. Incoming locals from the West side when received on No. 5, stop clear of the fouling bar and the scotch block west of cross over 29-29, and to receive a train from Pazundaung on this line, while a train from the West side is standing clear of the bar, cross over 29-29 must be set against the occupied portion of the 5th line.

18. There are speed restrictions of 5 miles an hour for all incoming and ten miles an hour for all outgoing trains or shunting engines between the East and West Signal Cabins in compliance with the terms of Railway Board's sanction, conveyed in their letter No. 307-R. C., dated 3rd February 1912, to the reduction of the adequate distance laid down in Rule 50 (1) of the General Rules.

Conclusions.

19. Shunting porter Mahabir Singh admits that he received orders from Assistant Station Master Mr. Foxwell to back the rake of B 10 Down local from the West to the East end of No. 6 line so as to clear cross over No. 29 and to then bring the rake to a stand.

20. The length of the rake was about 400 feet while the length from the fouling point of cross over 29 to the fouling point of the crossing where the accident took place is about 800 feet.

21. Shunting porter Mahabir states that shunting porter Hardeo Singh was signalling the shunter to move ahead, although he admits that he gave him no orders to do so.

Shunting porter Hardeo Singh denies that he was on the rake of B. 10 local when it was being backed and states that he was waiting on No. 6 platform all the time The evidence of shunting Jemadar Ramsorrasy corroborates this. Shunter Anthony, his fireman Mungaloo and the first fireman Butchu of 34 Down all say that someone was at the front of the empty rake of B. 10 local giving green signals. There is no evidence obtainable as to who this was and it is difficult to believe that anyone in that position would have failed to show a danger signal to the shunter as 34 Down, entering the Yard must have been clearly visible. The pilot jemadar had been sent to No. 1 road to clear the stock of F. 18 Down. He did not take his shunting engine with him but did the shunt with the engine working the train as this line was required for 2 Down Express which was immediately behind F. 20 Down. Moreover this shunting porter Mahabir Singh is stationed under orders of the Central Cabin for piloting local engines round their trains *via* the cross overs in the centre of the yard and would have no one else working with him. The statements that any signals were given from the brake end of the local rake are therefore not credible and shunting porter Mahabir Singh was solely responsible for giving signals to the shunter, yet though he was on the footplate of the engine he failed to make it clear to the shunter what he was required to do. Shunting porter Mahabir Singh is therefore mainly responsible for the accident in that he breached General Rule 229.

22. Assistant Station Master Mr. Foxwell admits that he did not warn shunting porter Mahabir Singh that 34 Down was coming in when he ordered him to move the rake of B. 10 Down and by not doing so and in that he ordered this shunt to be carried out while B. 10 Down was approaching I consider he breached General Rule 260.

23. Officiating Deputy Station Superintendent Mr. D'Mello who was present and who heard Mr. Foxwell give these orders is also in my opinion jointly responsible for the breach of General Rule 260.

24. *Vide* paragraph 14 above Road No. 6 is signalled for the admission of trains for shunt moves from the East side towards No. 6 in precisely the same manner as roads 1, 2, 4 and 5 but it is not signalled for shunts or departure of trains towards the East side from No. 6.

In the printed working instructions it is laid down that "If for any reason it is necessary to do a shunt which is out of the ordinary and therefore not signalled, the engine shall be piloted by the Shunting Jemadar."

Shunting Jemadar Ramsorrasy was attending to the shunting of F. 18 Down local rake at the West end of the Yard and therefore Assistant Station Master utilized shunting porter Mahabir to move rake B. 10 local which was outside his ordinary duty. It was therefore especially necessary to give him careful and explicit instructions.

Recommendations.

25. The Railway Administration have for some time had under consideration the provision of additional facilities so as to relieve the congestion due to the growth of suburban traffic. With this object a new covered island platform has been constructed between lines 6 and 7 and line 6 has been provided with shunt out and starter signals at the East end.

It is therefore recommended that these facilities be brought into use as early as possible.

E. L. MANLEY,

M. INST. C.E.,

Government Inspector of Railways,
Circle No. II-A, Burma.

Document accompanying :—

Diagram showing site of accident and signalling. (Appendix A.).

APPENDIX A.

ROUGH PLAN OF STOCK AFTER ACCIDENT TO 34 DOWN AT RANGOON STN ON 18-5-27.

NOT TO SCALE.

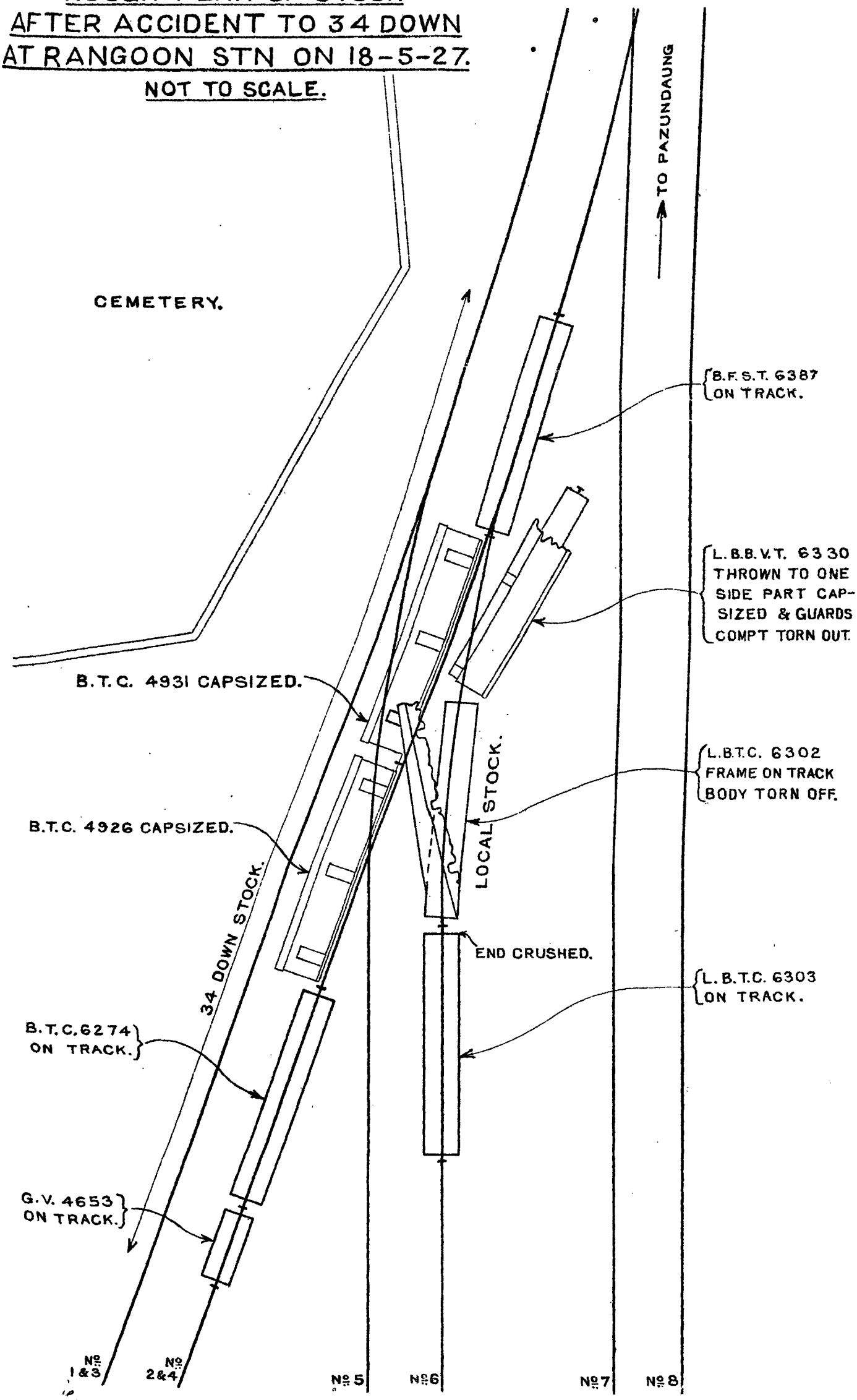

Photo. Zinco. December, 1927.—No. 731.550

BENGAL-NAGPUR RAILWAY.

DERAILMENT OF No. 90 UP MIXED TRAIN AT KENDPOSI STATION ON THE 12TH AUGUST 1927.

No. 956.

FROM

LT.-COL. C. J. CLARKE, D.S.O.,
SENIOR GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE No. 1, CALCUTTA.

To

THE SECRETARY,
RAILWAY BOARD,
SIMLA.

Dated Calcutta, the 18th August 1927.

SIR,

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith the report of my enquiry into the circumstances attending an accident to the 90 Up Mixed train at Kendposi, a station on the Amda Gua Branch of the Bengal Nagpur Railway, on the 12th August 1927 resulting in the death of two passengers, serious injuries to three and slight injuries to five others.

2. The following officers attended the enquiry held on the 14th August 1927 at Kendposi :—

I. Hunter, Esq., District Commercial Officer, Chakardharpur.
G. Cunningham, Esq., Superintendent General, Loco., Khargpur.
H. F. Ellison, Esq., District Engineer, Chakardharpur.
G. T. Grafton, Esq., District Loco. Superintendent, Khargpur.
J. R. Dain, Esq., Deputy Commissioner, Chaibassa.
Mr. T. N. Rai, Inspector, G. R. Police, Chakardharpur.

Description of Accident.

3. The 90 Up Mixed train left Jhinkpani (mile 204) at 10-30 hours on the 12th August and at 11 hours, when entering the platform line at *Kendposi* (mile 215), the first thirteen vehicles took the turn out at the facing points correctly, but the 14th vehicle and eight others following went on to the straight line causing the derailment of the 13th and 14th vehicles; after being dragged for about 300 feet the 13th vehicle fell over on its side, and the 14th very nearly so. The couplings did not break and all other vehicles remained standing on the rails.

4. The *composition* of the train was an engine, 6 goods vehicles and a rake of 16 4-wheeled coaching vehicles chiefly 3rd class. The rake is a block rake of an old type with pin and link couplings, and each vehicle has buffers at one end only. It was vacuum braked.

5. The *casualties* were 3rd class passengers in the 13th vehicle. They consisted of one woman aged about 40 years, one girl aged about 7 years killed and 3 men seriously and 5 slightly injured. The woman was found outside under the vehicle and must have jumped out just before it fell over.

The Assistant Surgeon from Chakardharpur and the Sub-Assistant Surgeon from Dangoaposi were in attendance by 14-30, the injured attended to and conveyed by the Relief train to Chaibassa Hospital.

6. Except to the switches at the facing points there was little damage to the permanent way. The two derailed vehicles were slightly damaged otherwise there was no damage to rolling stock. The line was cleared in a few hours.

Description of the Locality of the Accident.

7. The approach at *Kendposi* from Jhinkpani is on a long ascending grade averaging $1\frac{1}{20}$. There is a straight line through the station with a loop on each side of it, and a short goods loop with dead ends. The first facing points take off to the left for the platform line and it was at these points that the 90 Up took two lines the first half going on to the platform line and the second on to the straight.

8. The station has one Outer signal in each direction. All points are worked by levers at site and secured for the passage of trains by padlocks. The crossing at the facing points is 1 in 12 of 90 lbs. section.

Conclusions.

9. The switch rails were damaged by the accident but as far as I could judge they were in good order before, although slightly chipped near the tip. The points have a gauge tie plate and the gauge was correct. The right hand switch had the appearance of being burst through in the facing direction when held by the locking bolt and padlock. The slight chipping extended to 14″ from the tip and then the table of the switch for a length of 10″ was bent inwards apparently by a flange forcing its way between the stock and switch rails; this formed a kind of trap which would deflect any wheel on to the straight line.

10. The Station Master is required by the Rules to lock facing points himself. The operation with the lock in use is as follows:—

(*a*) a bolt with a screw thread on it is put through a hole in the stock and switch rail from the outside.

(*b*) a nut is put on the bolt on the inside and screwed up.

(*c*) a tapered cotter is put through slots in the bolt and nut.

(*d*) the end of the cotter is padlocked through a hole provided for the purpose, so that it cannot be withdrawn.

If the parts are properly made and not worn, it is not possible to put the cotter through and padlock it unless the switch is properly housed. With the apparatus actually used at the points on the day of the accident it was found that owing to the cotter being narrow the padlock could be put on and leave $\frac{3}{4}$″ play between the stock and switch rail, if the nut was not fully screwed up.

11. The Station Master states that he proceeded to the points and padlocked them himself and I see no reason to doubt that he did so. He further stated that he locked them securely. He must be given the benefit of the doubt, but I think that he probably did not screw the nut up to the full extent and some play was left between switch and stock rail. The movement of the rear wheels of the 13th vehicle may have caused the point of the switch to move just as the sharp flange of the wheel on the 14th vehicle reached it.

12. An examination of the wheels of the 14th vehicle showed that the flange of the leading right hand wheel was very sharp. From the marking on the sole bar this vehicle had been through the shops at Khargpur on 23rd April 1926 and had been oiled at Dangoaposi as recently as 9th August 1927. Ordinarily it leaves Amda with the daily train at 8 hours, and returns by 20 hours at night. Owing to a breach in the line the rake to which it belonged had been detained for about a fortnight on the other side at Dangoaposi and was returned to Amda on the night of the 11th August the day before the accident. The Assistant Carriage Examiner

at Dangoaposi stated that it was in good condition when he returned it, and a note in the diary of the head fitter at Amda shows that it was accepted as being in good condition. From the evidence both Assistant Carriage Examiners appear to have depended too much on their fitters.

13. In view of the long grade approaching the station there is no reason to suppose that speed over the points was more than 10 miles an hour as stated by the Driver and Guard.

14. I am of opinion that the accident was due to the sharp flange on the right hand leading wheel of the 14th vehicle probably assisted by a slight gap between the right hand switch and stock rail.

15. I consider that the Assistant Carriage Examiners at Amda and Dangoaposi had ample opportunity of discovering the condition of the wheel and would have done so if they had not depended so much on their fitters.

Recommendations.

16. I recommend that—

(*a*) wheels of similar old pattern rakes should be examined and carriage examiners reminded that they should inspect running gear frequently themselves and not depend too much on the fitter's reports;

(*b*) locking gear for facing points should be tested and any found defective withdrawn.

I have the honour to be,

SIR,

Your most obedient servant,

C. J. CLARKE, LT.-COL.,
Senior Government Inspector.

141RB

SOUTH INDIAN RAILWAY.

DERAILMENT OF No. 5 EXPRESS PASSENGER TRAIN AT CHETPAT ON THE 28TH JUNE 1927.

No: S.-27/262.

FROM

BREVET COL. F. R. H. EUSTACE, D.S.O., R.E.,
SENIOR GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE No. 7, OOTACAMUND.

TO

THE SECRETARY,
RAILWAY BOARD,
SIMLA.

Dated Ootacamund, the 22nd September 1927.

SIR,

I have the honour to report for the information of the Railway Board the circumstances attending an accident which befell a passenger train at Chetpat on the South Indian Railway on June 28th last. Being engaged at the other end of the Circle I did not attend the official enquiry but though the resulting material damage was not great and only one traveller was slightly hurt the case presents features of importance and general interest.

Chetpat is a suburban station on the Metre Gauge about 1½ miles from Egmore Station. There is a single crossing loop from which takes off a lay-bye dead end siding with the points facing for Up trains, *i.e.*, those from the direction of Egmore, Madras. The station is "partially" interlocked on the Dutton System, that is to say there are the usual bracket signals at the points worked from an interlocked frame on the platform and checked by point detectors.

On the facing points in the loop and the protecting derailing switch in the lay-bye are succession key locks and the master key when out of the signal lever frame locks the signals.

At about 18 hours on the date in question the lay-bye points were opened to stable a ballast train which backed into the siding. The engine then left for Egmore. Two passenger trains passed by the loop in the down direction in the interval between the departure of the ballast train engine and the arrival of No. 5 Trivandrum Express.

This train was timed to have Egmore at 21-30 and was due to run through Chetpat, crossing there No. 238 Down passenger, five minutes later. On this occasion the train was to time and was received on the loop. The engine apparently passed the lay-bye facing points safely but the next two coaches took the dead end line, dragging off the tender and engine. The latter was deflected towards the main or platform line missing the passenger train standing thereon by inches. Fortunately the speed of the Trivandrum train was low, probably about 10—12 miles per hour, and the driver was prompt in applying his brakes when he realised something was wrong, otherwise the consequences would have been serious. In the event one passenger (without a ticket who absconded) was slightly hurt and the damage to the rolling stock was not irreparable.

On the cause of the accident the evidence is I consider clear. After the departure of the ballast train engine from the lay-bye the trap switch therein was duly closed and locked, but the key, instead of being taken in due

succession to set the entrance points to the lay-bye in the loop (thereby releasing the second or correct controlling key), was taken to the signal frame into which it unfortunately fitted and where it was afterwards actually found. The signals were thereby released with the lay-bye facing points wrongly set and locked, the station staff suspecting nothing. One of the subsequent down passenger trains, probably No. 234 at about 19 hours, must have trailed through the incorrectly set points, breaking the lock and connections and of course rendering them insecure for an Up train. The Dutton System has been in use here for 21 years. The keys are of the female type and selection or discrimination is effected by the relative axial positions of a central pin (hemispherical on one side and rectangular shaped on the other), and a small lug on the shaft. The two right angled corners of the pin had been rounded by wear and had thus lost their selective properties.

The Committee of Enquiry found the Guard, the two Assistant Station Masters, and pointsmen, guilty of neglect in their duties in locking and inspecting the points and in not ensuring that the correct key was released and have also recommended that the Signal Inspector (on leave at present) who inspected the interlocking last March "be dealt with departmentally as to the reason why it was found possible for the derailing switch key to fit the lock on the lever frame ".

The Agent has agreed with the finding of the Committee but in my opinion their recommendations are inadequate. The primary cause of the accident is obviously the fact that the two keys were at least partly interchangeable, a very unsatisfactory state of affairs, and more definite steps appear to me to be desirable in view of the extent to which key-locking is relied on and adopted by the South Indian Railway system.

I have accordingly addressed the Agent, South Indian Railway, to this effect with further recommendations of my own and a copy of my letter for the information of the Railway Board, I have the honour to forward herewith.

I have the honour to be,
SIR,
Your most obedient servant,

F. R. H. EUSTACE,
Senior Government Inspector.

22nd September 1927.

COPY OF LETTER FROM THE SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 7, OOTACAMUND, TO THE AGENT, SOUTH INDIAN RAILWAY, NO. S.-27/262, DATED THE 22ND SEPTEMBER 1927.

With reference to the copy of the proceedings of the joint enquiry forwarded to me with your A. F. 27/256/52 of 15th August 1927 and my subsequent enquiries on certain points, I have the honour to say that while agreeing with the conclusion of the Committee on the immediate cause of the accident, I do not consider that their recommendations go far enough.

2. It is clear that the primary cause was the existence of two keys more or less interchangeable and it is doubtless unnecessary to mention here that for a system of key-locking the vital requirement is the absence of any possibility of any such key interchange. If this possibility is present the system is worse than none at all. The Committee in making their recommendations do not appear to have given this point full consideration, bearing in mind the extent to which partial or key-locking is in use on the South Indian Railway.

3. The fact that this particular defect was found at Chetpat only three months after a periodical inspection, must indicate, I think, either the want of an improved system of inspection or very serious negligence on the part of the Inspector.

4. Again, from the evidence it would appear that the Committee attached some importance to the due discrimination of the keys by means of their weights or shape of handle. While doubtless useful for purposes of general identification no reliance at all can be placed on such differences as measures of safety.

5. The actuating parts of the keys at any particular station should be so decisively different in shape, that wear and tear notwithstanding, there can be no manner of doubt about their correct fitting. In the case of the male type of key with the many combinations possible of sizes and shapes of lugs and wards and their positions axially with respect to each other, a safe selection for any group with little or no overlapping of key hole apertures should present no difficulty.

6. The female key of the Dutton type is unsatisfactory, relying as it does for selection on the two corners of the central pin which eventually become rounded with wear (as in this case) and it appears impracticable to improve it. The only suitable course seems to be to eliminate all, or all but one, at the most, at stations where this system still remains, replacing keys and locks of a different type.

7. I would therefore recommend to you the necessity for—

(*a*) a scrutiny of the rules for the periodical expert inspection of the numerous key-locking installations on your system with a view to their revision where necessary to provide for a more careful examination of the fitting of keys and locks. I may have a definite recommendation to make on this point when I have received a copy of these rules.

(*b*) the substitution of keys of a different type for all but one (at the most) at all stations where the female type of key is still in use.

(*c*) an investigation of the actual conditions at other key-interlocked stations on your system and the correction, where necessary, of the keys and locks so as to conform to the conditions mentioned above in paragraph 5. I am aware that there are only two or three Dutton's systems remaining, to be replaced in the near future, and that the male key type is now generally used, but I make this recommendation as the result of subsequent observation elsewhere.

8. I also consider it desirable that siding points in such circumstances should be rodded with the corresponding derailing switch. Though want of traffic may, on less important lines, warrant the economy of the use of succession locks, at Chetpat and similar stations on the main line the volume of traffic surely justifies the additional expenditure in the interests of safety. If the siding and trap points had been so connected in this case this accident would not have occurred.

9. Lastly, there is also for your consideration the desirability of detecting with the signals points facing in the running lines other than facing points. When trains run through on the loop, as is customary on the South Indian Railway, the detection of these points bears importance similar to that of the facing points.

BURMA RAILWAYS.

DERAILMENT OF No. 82 DOWN LOCAL MIXED TRAIN AT MILE 494/20 ON THE 18TH JULY 1927.

No. 809/3-A.

FROM

MR. E. L. MANLEY, M.INST. C.E.,
GOVERNMENT INSPECTOR OF RAILWAYS,
CIRCLE NO. II-A, BURMA,

To

THE SECRETARY,
RAILWAY BOARD,
SIMLA.

Dated Rangoon, the 20th October 1927.

SIR,

I have the honour to forward my report on the derailment of No. 82 Down Local Mixed train at mile 494/20 between Kanbalu and Thityabin, Burma Railways System, which occurred on 18th July 1927.

1. *Description of the accident.*—At 17-30 hours on 18th July 1927 the Engine (F.-33), 6 four-wheeler covered goods wagons loaded with paddy and rice, one bogie truck (water tank) and one four-wheeler brake van of No. 82 Down Local Mixed train capsized at mile 494/20, and the two leading wheels of one loaded bogie truck derailed, due to the engine having run over a cow. The engine was not only derailed and capsized but turned completely round, the tender being thrown on its side across the track. No passengers were injured but the second fireman was killed, having been crushed beneath the tender. The driver and two firemen were slightly injured and were sent to Kanbalu hospital for treatment.

Through communication was restored at 10-30 hours on 20th July 1927.

2. *Description of the locality of the accident.*—From mile 497/75 to the site of the accident the line is slightly undulating on grades of 1 in 200 the average gradient being level and at the site of the accident there is a short length of 2 degree curve.

3. From mile 494/21 to 494/20 wood fuel for the locomotive department was stacked on both sides of the track at from 10 to 12 feet from its centre.

4. This branch line is not fenced between stations.

Conclusions.

5. The accident was caused by a cow rushing on to the track close in front of the engine. Thus the driver had no time to avert the accident in any way.

There were fuel stacks on both sides of the line where the accident happened.

Recommendations.

6. It is inadvisable to have fuel stacks on both sides of the line at any one place as cattle are liable to behave as if hemmed in by them and thus be run over when they would otherwise escape. I have therefore requested the Agent to give orders forbidding this practice. These orders have been issued.

7. The engine was fitted with the bar type of cattle fender. New engines fitted with folding buffers are provided with the plated type of cattle fenders. It is recommended that all engines be fitted with the latter type of cattle fender as early as possible.

E. L. MANLEY, M.Inst. C.E.,
Government Inspector of Railways,
Circle No. II-A, Burma.

GIPD—L 141 RB—18-1-28—553

Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into Accidents

Which occurred during the

Half-year ending the 31st March 1928.

No. 3.

Issued by the Government of India Railway Department (Railway Board)

SIMLA
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BOMBAY BRANCH
OF THE
Royal Asiatic Society.

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NORTH WESTERN RAILWAY.

COLLISION BETWEEN NO. 82 DOWN PASSENGER TRAIN AND A MOTOR BUS, NO. 2180-A, AT THE LEVEL CROSSING AT VERKA STATION ON 1ST OCTOBER 1927.

FROM MR. W. V. BUTCHER, SENIOR GOVERNMENT INSPECTER OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, DELHI, DATED THE 6TH NOVEMBER 1927.

In accordance with rule 7 of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I submit herewith a report of the enquiry held by me into the circumstances attending the collision between 82 down passenger train and a motor bus No. 2180-A at the level crossing Mile 4|24 at the Amritsar end of Verko station at 14-10 hours on 1st October 1927.

2. I started my enquiry at Verka on the 4th October and continued it at Amritsar on the 5th October to take evidence from the witnesses in hospital.

3. The following officers attended the enquiry on the 4th and 5th October 1927 :—

A. Dale Green, Esq., Deputy Chief Commercial Manager, Lahore.

H. D. Furley, Esq., Deputy Chief Operating Superintendent, Lahore.

Lieutenant-Colonel W. Macrae, R.E., Deputy Chief Engineer, Lahore.

Major H. L. Woodhouse, R.E., Divisional Superintendent, Lahore Division, Lahore.

E. J. Asquith, Esq., Magistrate, 1st Class, Amritsar.

A. L. F. Evans, Esq., Assistant Inspector General, Railway Police, Lahore.

4. *Description of the Accident.*—On the 1st October 1927, at 14-10 hours, the engine of No. 82 down passenger train while entering Verka station yard collided with a road motor bus at the level crossing, and carried it 414 feet on the cow-catcher until the train stopped.

5. The collision resulted in the death of 10 bus passengers and injuries to 18. The latter included the bus driver of the motor bus who was seriously injured. The injured were attended to by Verka Station staff and were brought into Amritsar by 63 Up which was standing in Verka Station at the time of the accident. This train left Verka at 15-7 hours, stopped at the scene of the accident to pick up the dead and injured, and then proceeded to Amritsar arriving there at 16-22 hours. On arrival the injured persons were taken to the Civil Hospital.

6. No passengers or Railway staff of the passenger train were injured.

7. The total damage to the train rolling stock was approximately twenty-five rupees.

8. The weather was clear and the accident occurred in broad day light.

9. The sketch of the site of the accident attached shows the relative position of the railway and the road, the gradients, trees and other factors effecting the case.

10. The passenger train at the time of the accident was running at a speed of about 27 miles per hour. When approaching the level crossing which is about half way between the down outer and the down home, both these signals had been lowered for the passenger train to proceed to the station. When the train reached the level crossing it collided with the bus which was heavily loaded. The bus contained at least 32 passengers and was proceeding at excessive speed as it approached the level crossing, where it was forced to stop, owing to the far gate being closed, and was run into by the train.

11. *Description of the locality of the accident.*—The site of the collision was on the level crossing at mile 4|24 at the Amritsar end of Verka junction station yard.

12. Verka junction station is situated at mile 5 on the Amritsar-Pathankot Section of the North Western Railway. The adjoining station is Amritsar at mile O in the up direction.

13. The line is straight from the level crossing at mile 4|24 towards Amritsar for 10,500 feet and has an easy grade of 1 in 2,250 feet up, towards the level crossing from the Amritsar side.

14. The gate on the Amritsar side of the level crossing is clearly visible from the road from the Amritsar side. The gate on the Batala side of the level crossing is clear for a distance of approximately 400 feet from the gate towards Batala, beyond this it is partly obscured up to the road caution board and further on entirely obscured.

15. The large trees at the toe of the Railway bank on the Amritsar side of the level crossing shown in the sketch entirely obscured the down train engine driver's view of the road on the Batala side likewise the bus driver's view of an approaching train from Amritsar side, as he approached the level crossing from Batala side.

16. Road caution signs are erected on both sides of the crossing and the sign on the Batala side is situated at 643 feet from the centre of the level crossing.

17. There is one set of gates opening outwards on each side of the level crossing. The gates are of wood with iron ties, painted white with a large red disc in the centre of the gates 2½ feet diameter—this disc shows red to the road traffic when the gates are closed. The gates are not co-acting and each set of gates is closed by a chain and padlock.

18. The line clear book shows that 82 down left Amritsar at 13-55 hours on the 1st October 1927 and the out report was received at Verka at 14 hours on the same date, and according to statement 82 down passenger train arrived at Verka level crossing at 14-10. This gave 10 minutes from the time the out report was received to lower signals and close the gates. In a test case it took 3 minutes to lower signals and if the signals were lowered on the 1st October in 3 minutes it gave the gate man 7 minutes to close the gates.

19. *Conclusion.*—Jalal Din, gatekeeper gave a clear and straight forward statement which was unshaken by cross examination and corresponded with his previous statement made almost immediately after the accident to Mr. A. A. Phillips, Divisional Commercial Officer, Lahore Division, North Western Railway. I accept his statement and consider he had closed the Amritsar side gate and locked it and was proceeding to close the Batala gate when the bus forced its way on to the level crossing.

20. Wali Mohammad, Guard, North Western Railway, was in a good position to see the position of the gate and his brake van had stopped close to the level crossing. He supports the gatekeeper and I accept his evidence.

21. Attaullah Khan, Bus passenger, gave a clear statement which was slightly shaken under cross examination. He was injured and states he became unconscious and for this reason his evidence on points immediately prior to the accident as regards the gate and gatekeeper are not reliable.

22. The evidence of Dalip Singh and Atma Singh is important, they being witnesses who were on the road on the side on which the gates were closed, and goes to support that of the gatekeeper.

23. The driver's evidence is affected by a desire to protect himself. The evidence of some of his own passengers contradicts his statement that the gates were open. His statement that he was not warned about the railway signal and that a train was approaching is contradicted by a passenger on the bus. He himself says that he always looked at the Railway signals but failed to do so on this occasion.

24. The evidence is conclusive that the gate on the Batala side of the level crossing was open at the time of the accident.

25. As regards the gate on the Amritsar side the evidence is conflicting. On this point the evidence can largely be classified according to the point of view from which the witness saw the gates.

26. Witnesses who state that both the gates were open were all on the Verka side of the level crossing, *i.e.*, on the side where the one set of gates was entirely open, this being the set of gates nearest to them and most prominently in view ; inspection of the site shows the possibility of a witness seeing one set of the gates open, inferring that he had seen both sides open.

27. I am of opinion that the set of gates on the Amritsar side was closed and locked, but the set of gates on the Verka side were open, and the gateman was

prevented from shutting them owing to the motor bus coming on to the level crossing.

28. I am of opinion that the driver of the motor bus was driving at excessive speed with an overcrowded car. He ignored the railway signal when pointed out to him by witness Atta Ullah Khan and also the road caution signal. He evidently made up his mind to get on to the level crossing, in hopes that the gate on the far side would be opened for him in time. He was told by the gatekeeper to go back as the train was coming. The bus driver had no excuse whatever for coming on to the Railway track unless he was absolutely certain the gates were open and the road clear. Owing to his rash and negligent driving, ignoring the road sign and forcing his way on to the level crossing he was run into by the engine.

29. I am of opinion that the driver of the motor bus was entirely responsible for the accident by his rash and negligent driving.

30. *Recommendations.*—Owing to this having become an important level crossing the set of gates on both sides should be rod coupled so that they will open and close simultaneously.

(2) In view of the rapidly increasing road traffic over important level crossings the question of rod coupling gates should be considered by the North Western Railway administration.

(3) Before the down outer signal is lowered the gates should be closed and locked, the gates on Batala side of the level crossing can be seen from the centre of Verka station platform.

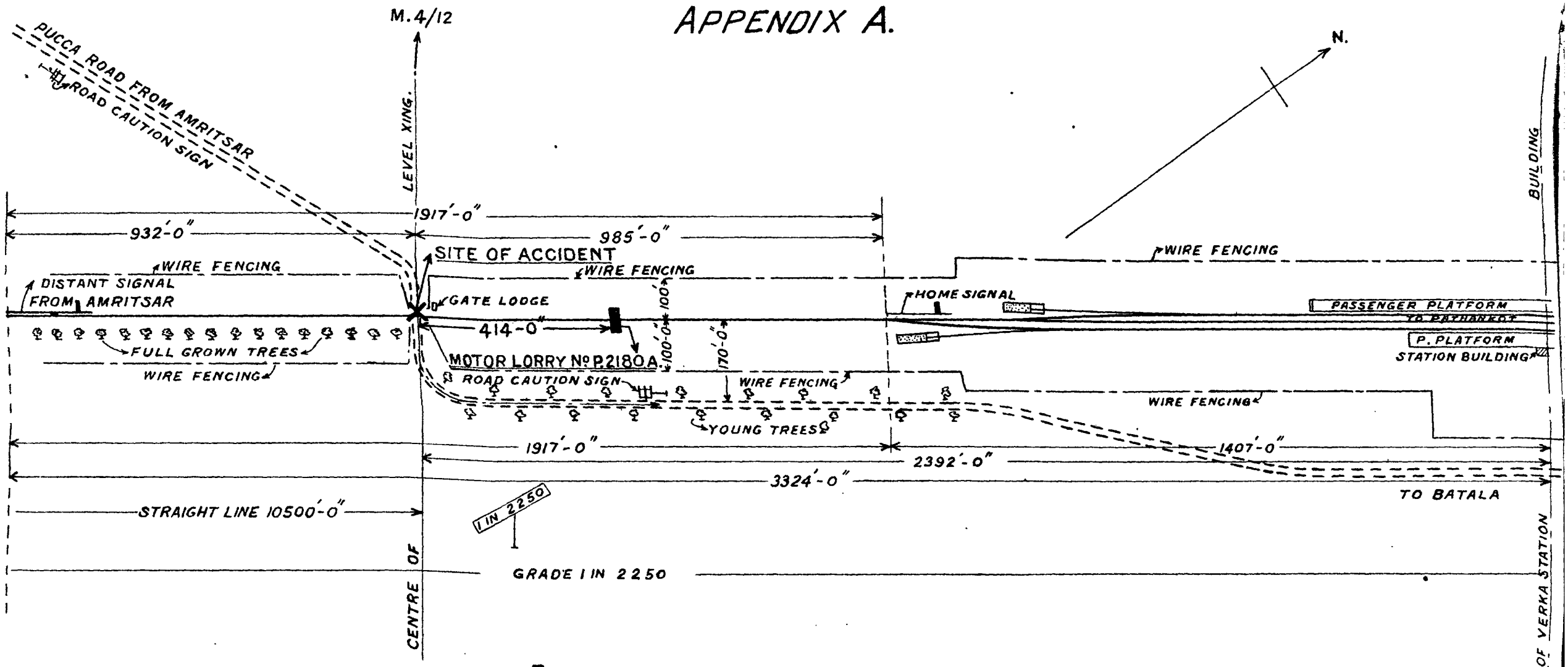
(4) The large trees at the toe of the railway bank on the Amritsar side of the level crossing should be cut down for 300 yards to give a clear view of the road for the driver of a down train and so that a motor driver approaching the level crossing from the Batala side can see if a train is coming.

(5) The small trees on the railway side of the road on the Batala side of the level crossing should be removed from the level crossing to the road caution board.

Document accompanying :—

Diagram showing site of accident. (Appendix A.)

APPENDIX A.



PART PLAN OF VERKA STATION YARD
SHOWING SITE OF ACCIDENT.

SCALE 250 FT TO AN INCH.

No.67:550

BENGAL NAGPUR RAILWAY.

DERAILMENT OF THE HOWRAH-RANCHI EXPRESS AT MILE 75|13 ON THE NAGPUR LINE ON THE 5TH OCTOBER 1927.

FROM LIEUTENANT-COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 1120, DATED THE 10TH OCTOBER 1927.

I beg to report for the information of the Railway Board the result of my investigations, made on the 7th October, into the above accident.

2. The Express left Khargpur (mile 72) at 23-38 on 5th October 1927 and was derailed at mile 75|13 on the Nagpur line at 23-50.

3. The line is on a low bank on a grade against the train. The Permanent-way consists of 85 lbs. F. F. rails on pot sleepers 12 to a 30 ft. rail. Fish plates are 4 holed. The foot of the rail is secured to each sleeper by a distance piece and tapered steel key. The rail has a bearing on the sleeper of 1 ft.—6 in. The whole was in good order as was the Rolling stock. The speed nearing the top of a grade was between 20 and 30 miles an hour. The engine and the first bogie passed over the spot safely, the 2nd to 6th bogie inclusive derailed, the 7th bogie and brakevan remained on the rails. The derailed bogies were slightly tilted to one side or the other ; none of them fell over. No one was injured and all passengers were forwarded by a relieving train as soon as circumstances permitted.

4. There is no doubt that the cause of the accident was the removal of all the fastenings, *i.e.*, fish plates, bolts, distance pieces and keys, of one rail on the right hand side in the direction of the moving train. All the fastenings were found in pools of water within 100 ft. of the spot. The rail was left in position and so the Driver had no chance of detecting anything by the Search light with which the engine was fitted. The passage of the engine and bogie disturbed the rail, the leading wheels of the 2nd bogie hit the end of the rail, threw it out of position, and the derailment followed. The Driver showed presence of mind in pulling the train up gradually and so kept all the coaches in a more or less upright position.

5. On the 25th September last two fish plates were removed at mile 74|10 and since that date a patrol of 6 men had been put on this section from mile 73 to 77. The fastenings were removed shortly after the patrol had passed over the spot.

6. The Police are investigating the case, and in order to prevent a recurrence I have requested that all lines in the neighbourhood of Khargpur should be patrolled.

HOWRAH-AMTA LIGHT RAILWAY.

ACCIDENT ENTAILING INJURIES TO 7 PASSENGERS WHO WERE TRAVELLING BY THE NO. 44 DOWN TRAIN ON THE 9TH OCTOBER 1927, BETWEEN BARGACHIA AND DAKHINBARI STATIONS.

FROM LIEUTENANT-COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 1139, DATED THE 15TH OCTOBER 1927.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of the enquiry held by me into the circumstances attending an accident entailing injuries to 7 passengers, one of whom has since died, who were travelling by the 44 Down on 9th October 1927 between Bargachia and Dakhinbari stations on the Howrah-Amta Light Railway.

2. The enquiry was held at Bargachia on the 13th October 1927.

The following Officers were present :—

Mr. G. C. Das, Engineer-in-Chief, Martin and Company's Light Railways.

Mr. D. Y. Anderson, Traffic Manager, Martin and Company's Light Railways.

Mr. G. C. Sturgis, Superintendent of Police, Howrah.

3. *Description of the locality of the accident.*—The accident took place between Bargachia and Dakhinbari at mile 11 at a point between Telegraph posts numbered 16 and 17.

The Light Railway here runs along the road, on the right hand side of it looking in the direction in which the 44 Down was running. The Railway is on a low bank and rail level is two feet above the road level. The road is in bad order and about to be repaired for which purpose metalling and bricks have been collected which obstructed the road way from its left edge towards the Railway leaving only a narrow passage for carts. Owing to this obstruction the marks left by cart wheels come within 9 in. of the rail.

The line is slightly curved but a good view can be obtained of the site by an approaching train.

4. *Description of Accident.*—On the 9th October 1927 at about 16 hours No. 44 Down passenger from Bargachia to Dakhinbari was passing some bullock carts on the road at the point above described when some portion of one of the carts fouled the line sufficiently to hit the passengers, who were travelling on the footboards of the train, with the result that 7 were seriously injured of whom one died after admission to Hospital. All the injuries were fractures to the legs, 3 of them to the right leg. The injured were placed in the train and taken to Kadamtala whence they were sent to Howrah Hospital by Ambulances.

5. The composition of the train was an engine, one upper class, 7 third class and two composite 3rd class and Brakevan ; all bogie stock. Each bogie has one side door at each end with a footboard the width of the door (2 ft.—6 in.).

6. There is a mark along the side of the coaches such as might be made by the tail end of a cart scraping along them and the hand rails of the brakevan at the end of the train were displaced otherwise there was no damage to the rolling stock. As the brakevan stopped short of the bullock carts the damage to the hand rails must have occurred when leaving the site of the accident.

7. *Conclusion.*—From the evidence it appears that when the train left Bargachia, fairly full but not crowded, there was no one standing on the footboards. Later on some passengers stood outside on the footboards as seen by the Driver and Fireman. The train was proceeding at 15 miles an hour. The Driver whistled and slowed up to 10 miles to pass some bullock carts coming towards him which he saw from some distance. As the carts were not actually fouling the line he proceeded past them, but hearing shouts he pulled up about three carriage lengths beyond a cart, which was scraping along the side of the carriages, having been slowed towards the line by the bullocks taking fright.

8. I accept this evidence as substantially correct. I have observed that passengers often travel from choice in two dangerous positions.

1. Standing on the footboards.
2. Sitting on the floor at the open door with feet on the foot boards and knees sticking out.

Judging from the injuries the passengers in this case were standing on the foot boards facing towards the rear of the train probably to avoid smoke from the engine going into their eyes.

9. I do not think any blame attaches to any Railway servant. Although the Driver, according to his statement, saw there were passengers on the footboards he could not be expected to pull up and make them get inside ; if Drivers were ordered to do this the passenger service could not be carried on.

10. I am of opinion that this regrettable accident was due to the passengers riding on the footboards, which is an offence under Section 118 (2) of the Railway Act, and the passengers themselves are to blame.

11. A contributory cause was that the bullock carts were forced to go closer to the Railway line than usual owing to the repairs to the District Board Road alongside, regarding which I have addressed the Road authority.

12. *Recommendations.*—It is not possible to make any useful recommendation to stop travelling on the footboards, the remedy lies with passengers themselves. Action under Section 118 (2) of the Railway Act is difficult as the offence takes place between stations as a rule ; the most the railway staff can do is to see passengers are inside the carriages before the train leaves a station.

It has been suggested that footboards should be removed or made narrower, but they are necessary in the bogie stock owing to the height of the floor and they must be made as wide as the door.

BURMA RAILWAYS.

COLLISION BETWEEN FIVE RUNAWAY VEHICLES AND UP LIGHT ENGINE F.-198 AT MILE 540|12-L. BETWEEN KONNYAUNG AND SE-EN STATIONS ON 6TH NOVEMBER 1927.

FROM MAJOR H. H. E. GOSSET, R.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A, BURMA, RANGOON, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, DATED THE 27TH JANUARY 1928:

In accordance with Rule 7 of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the joint enquiry held on the collision between five runaway vehicles and Up light engine F.-198 at mile 540|12-L. between Konnyaung and Se-En stations on 6th November 1927.

2. *Description of the accident.*—On 6th November 1927, at about 20-50 hours, 5 G. V. wagons ranaway from Manpwe station during shunting operations and after running through Konnyaung station, they collided with Up light engine F.-198 at mile 450|12.

3. The Driver and both firemen of F.-198 received serious injuries and the total damage amounted to approximately 10,000 rupees.

4. *Description of the locality of the accident.*—Manpwe is a B class station at mile 543¾ on the Lashio Branch.

From the catch siding at Manpwe the grade falls at 1 in 146 towards Konnyaung where there is a slip siding and the grade continues to fall after that station towards Se-En and Mandalay.

5. *Conclusions.*—The Station Master, Manpwe, was primarily responsible for the accident as he failed to see that the catch siding points were correctly set and locked against the main line after the engine of No. 5 Down goods had shunted it's train into No. 3 line.

He thus breached Working Instructions, Part II, paragraph 4-L. (*ii*) (*a*) and No. 5 of Manpwe Station Working Rules.

6. Jemadar Badamghiri of Manpwe failed to place the wagons off No. 5 Down goods in No. 3 line clear of the points, fouling board and scotch block and is responsible for uncoupling the five runaway wagons before the loads from No. 2 and 4 lines were backed down No. 3 line from the Lashio direction.

He thus breached Working Instructions, Part II, paragraph 4-L. (*iv*).

7. Further by failing to report at once that 5 wagons had runaway, Jemadar Badamghiri prevented the Station Master, Manpwe, from warning to Konnyaung in time.

8. The Konnyaung slip siding was not kept closed for the main line until the approach of Up light engine F.-198 was indicated by a whistle. If Station Master, Konnyaung, had not thus breached Working Instructions, Part II, paragraph 4-L. (*ii*) (*a*), by opening these points about 25 minutes too early, it is possible that the collision might have been avoided.

9. Had the Working Instructions and Station Working Rules been obeyed this accident would not have occurred. The evidence and connected papers disclose considerable slackness of the Station staffs in working to the rules and in the supervision of this branch line by the Traffic Inspector and Assistant Traffic Superintendent.

10. The punishment inflicted on the four men at fault appears to be somewhat lenient.

11. *Recommendations.*—Manpwe is a busy yard and strict compliance with the Working Rules is admittedly difficult and strict supervision is necessary.

12. The alternative proposals of lengthening the slip siding for shunting or putting in an additional slip siding or sand track should be decided promptly.

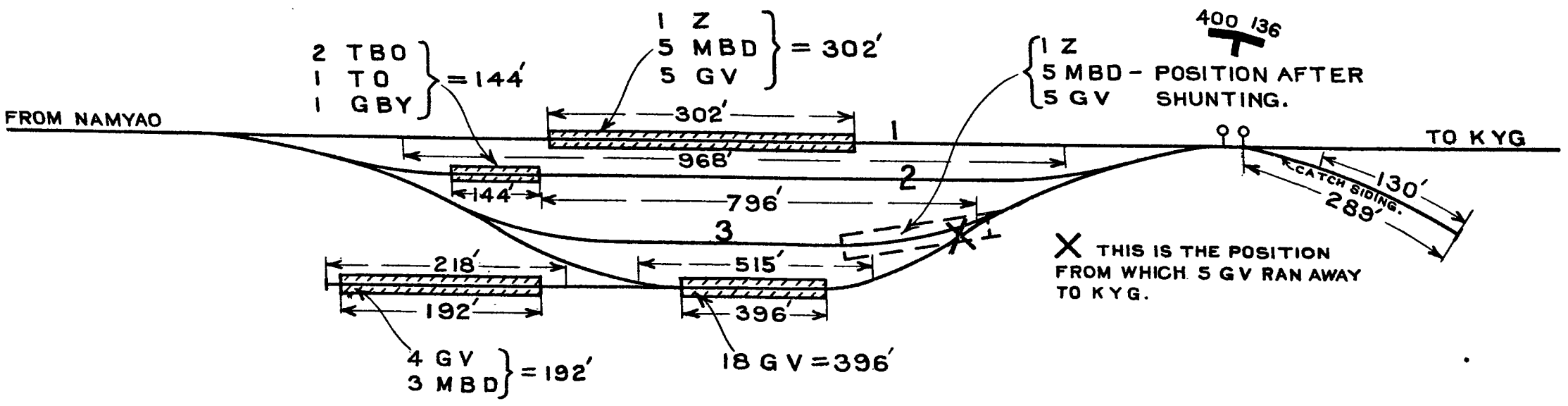
Document accompanying :—

Diagram of Manpwe yard. (Appendix A).

APPENDIX A.

SKETCH SHOWING DISTRIBUTION OF WAGONS IN M.P.W. YARD JUST PRIOR TO 5 G.V. WAGONS ESCAPING AND COLLIDING WITH ENGINE F 198 ON 6-11-27.

NOT TO SCALE.



SD. W. H. BUTCHER 11-11-27.
DISTRICT ENGINEER,
MANDALAY.

No. 288-550

BENGAL AND NORTH-WESTERN RAILWAY.

ACCIDENT TO NO. 30 DOWN MIXED TRAIN AT MILE 8|8 BETWEEN KISHENPUR AND HAIYA GHAT STATIONS ON THE SAMASTIPUR-DARBHANGA SECTION OF THE BENGAL AND NORTH-WESTERN RAILWAY, ON THE 22ND JANUARY 1928.

FROM MR. R. R. BYRON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, No. 859-T., DATED THE 4TH FEBRUARY 1928.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I have the honour to submit herewith, for the information of the Railway Board, the report of my enquiry into the circumstances attending an accident which occurred during the night of 22nd January 1928 to No. 30 Down Mixed train at mile 8|8 between Kishenpur and Haiya Ghat stations, on the Samastipur-Darbhanga Section of the Bengal and North-Western Railway resulting in the death of seven passengers and injuries to fifteen others, one of whom subsequently died bringing the total number of killed up to eight. I wish to draw attention to the number of killed and injured because it was suggested by a member of the local District Board who happened to be a passenger in the train that the number of killed and injured was much greater than reported. But I am satisfied from the result of my enquiry that not more than eight were killed or more than fifteen injured.

2. The following Officers attended the enquiry which was held at Kishenpur station on the 27th January 1928 :—

J. Williamson, Esq., Deputy Agent, B. and N.-W. Railway.
H. O. Clarke, Esq., Acting Chief Engineer, B. and N.-W. Railway.
J. A. Smith, Esq., Loco. Superintendent, B. and N.-W. Railway.
J. Westwood, Esq., Traffic Manager, B. and N.-W. Railway.
A. Robb, Esq., District Loco. Superintendent, B. and N.-W. Railway.
J. Brown, Esq., District Traffic Superintendent, B. and N.-W. Railway.
J. F. Izat, Esq., Resident Engineer, B. and N.-W. Railway.
J. G. Levingstone, Esq., Assistant Engineer, B. and N.-W. Railway.
A. Walker, Esq., Assistant Traffic Superintendent, B. and N.-W. Railway.
M. J. Dixon, Esq., I.C.S., Collector of Darbhanga.
Petter, Esq., Magistrate, Samastipur.

3. *Description of the accident.*—At about 20-30 hours on 22nd January 1928 whilst 30 Down Mixed was travelling between Haiya Ghat and Kishenpur stations, an empty road-van attached next to the engine was derailed on Bridge No. 11-A. (10 spans of 20 ft. girders) at mile 8|8 and striking the parapet wall of the abutment was thrown against the superstructure of the 3rd class bogie carriage, following immediately behind, which was torn off the undercarriage and completely wrecked. The undercarriage was derailed to the left of the line and the road van to the right of the line in the direction the train was travelling. The coupling between the road van and the engine was broken and the engine ran on ahead and was pulled up some eighty feet beyond the wreck.

The remainder of the train remained on the track and was practically undamaged.

4. The composition of the train was as follows and in the order given :—

Engine, " F " class, 0-6-0 type.
One four-wheeled Road Van.
Four bogie 3rd class carriages.
One six-wheeled Inter. and 3rd class carriage.
One six-wheeled Inter. class carriage.
One six-wheeled 2nd class carriage.
One six-wheeled First class carriage.
One six-wheeled Brake-van.

The train was non-vacuum.

5. The casualties were eight killed—seven died immediately and one subsequently after removal to hospital and fifteen were injured. All the casualties occurred to passengers seated in the wrecked bogie which was full and contained some 90 passengers, and no passengers in the other carriages were injured.

6. *Description of the locality of the accident.*—The accident took place at the end of a bridge situated in a long straight and level piece of road. Approaching the bridge for nearly 3 miles back the line is straight and on the level mostly over a low bank which continues for some distance beyond the bridge.

7. *Conclusions.*—The accident was due to the derailment of the Road van immediately behind the engine.

But there is no definite evidence as to what caused the Road van to derail. It was suggested at the enquiry that the indication led to the belief that the draw-bar of the tender which was found to be flawed over about 40 per cent. of the cross sectional area at the point of fracture, broke and the engine parted from the train which subsequently crowded down on the engine causing the empty Road van to mount the rails. But on reflection I am unable to accept this conclusion. It is my considered opinion that the draw-bar broke after the van derailed and not before as suggested. That the cause of the derailment was due to the fact that the Road van being empty was extremely light, its tare weight being only 4 Tons, 14 Cwt. and it was sandwiched in between the engine and heavy bogie stock, the tare weights of the bogie 3rds being 18 Tons, 10 Cwt. each with the result there would be a constant tendency for this light van to be lifted up whenever the following coaches bunched up upon it. As is well-known when a train is running no matter how tightly the couplings may be screwed up there is continual oscillation or concertina action between the ends of a train. In the case of a non-vacuum braked train any slackening of engine speed would immediately result in the bunching together of the coaching stock, and in spite of the Driver's assertion that he was maintaining an even speed of 22 miles per hour, I am of opinion that the speed was constantly varying within a few miles per hour but sufficient to cause the coaching vehicles to bunch up together with enough force to raise the Road van so that it mounted the rails and was derailed. The wheels then running on the sleepers threw a sudden additional strain on the already weakened draw bar of the tender which broke under the strain and caused the accident. I will now as briefly as possible give my reasons for this conclusion :—

(*i*) A careful examination of the track on the bridge where the derailment occurred showed no defects—the gauge was correct, the cross level of the rails was correct, the bridge sleepers in good condition.

(*ii*) There were no signs of any obstruction having been on the track. The possibility of something having fallen from the tender was considered and dismissed.

(*iii*) The wheels of the Road van were correct to gauge, the flanges and treads were only very slightly worn.

Having decided that the cause was not to be found in the above three cases, the serious flaw found in the broken tender draw-bar suggested that the breaking of the draw-bar was the cause of the derailment and subsequent accident. But I reject the theory that the draw-bar broke first and caused the derailment and maintain that it was the derailment which occurred first and it was the sudden severe jerk caused by the derailed van which broke the weakened draw-bar.

For the following reasons :—

Firstly had the draw-bar broken and derailed the van as suggested, then in my opinion the derailed van would have fallen over the side of the bridge before it reached the abutment, even as it was the van must have been on the point of falling over when it struck the abutment one wheel having travelled beyond the end of the sleepers.

The second reason I have for assuming the derailment occurred before the coupling broke is that the marks of the derailed wheels on the sleepers run for some distance parallel to the rails which seems to me to show that the leading end of the van was still being held straight by the tender coupling which broke at the point where the marks incline away to the right.

Had the van not been held in front by the tender coupling at the moment of derailment the tendency, with the whole train pushing it forward, would have been for the van to incline to the right, the side on which it was derailed, and it would have gone over the side of the bridge before reaching the abutment which was 50 feet from the point of derailment.

The breaking of the coupling was a contributary cause of the accident. Had the coupling held in all probability the truck would not have struck the parapet and might have been dragged along without upsetting the train until the Driver was able to bring it to a stop.

8. *Recommendations.*—The practice on this Railway when running mixed trains is to marshall the goods wagons in the front to facilitate shunting at way-side stations which has to be done by the train engine, and to suggest a different arrangement would certainly hamper the expeditious handling of these trains. But I think that with a little more care in marshalling these trains it might be possible to avoid having empty wagons in the front.

In the present case the derailed vehicle was a Road van presumably for small consignments to be loaded or unloaded at stations without detaching the van, such being the case there was no reason why this van should not have been at the rear of the train.

I recommend that—

(1) It be laid down that as a rule mixed trains should consist of passenger stock and fully loaded wagons which may be marshalled in front of the passenger coaches to facilitate shunting by the train engine at way-side stations.

(2) That ordinarily empty goods wagons will not be attached to these trains but that if for traffic reasons it is necessary to move empty wagons by these trains such wagons must be placed in the rear of the passenger coaches.

(3) That Road vans which from the nature of the work they perform are seldom fully loaded and are usually attached to a train throughout its journey should be attached in the rear of the train.

(4) Since goods vehicles are not piped these trains are controlled by hand brakes only. It should be laid down that *except in cases of emergency* whenever it is necessary for the driver to check the speed of a train which is not vacuum braked he will before applying the engine brakes call for the guard's brakes by three short and sharp blasts of his whistles. On hearing which the guard will immediately commence applying his brake.

This will tend to prevent the train from crowding down upon the engine when speed is being reduced.

BURMA RAILWAYS.

DERAILMENT OF No. 38 DOWN LOCAL MIXED TRAIN ON 23RD JANUARY 1928 ON THE PEGU-MARTABAN BRANCH.

FROM MAJOR H. H. E. GOSSET, R.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A., BURMA, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, DATED THE 20TH FEBRUARY 1928.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the enquiry into derailment of No. 38 Down Local Mixed on 23rd January 1928 on the Pegu-Martaban Branch, Burma Railways.

2. I attended the joint magisterial and railway enquiry held at Mayangon on 30th January 1928 and I inspected the track and the site of the accident next day with the District Engineer.

The following Officers were present on 30th January 1928 :—

Major F. L. Roberts, Deputy Commissioner, Thaton.

U. Than Tin, Sub-Divisional Magistrate, Kyaikto.

H. G. S. Thomas, District Locomotive Superintendent, Rangoon.

J. M. G. Doog, District Engineer, Rangoon.

E. I. Milne, Officiating District Traffic Superintendent, Moulmein.

3. *Description of the accident.*—On 23rd January 1928 at about 8-50 hours, No. 38 Down Local Mixed derailed in a cutting at mile 101|17 on the Pegu-Martaban Branch.

The leading twelve covered goods vehicles and three passenger bogie carriages overturned or jammed sideways across the cutting.

4. The four leading goods vehicles capsized and those following were telescoped or upset and badly damaged.

The three leading bogie carriages were derailed across the cutting and the coach work was smashed up, causing minor injuries to fourteen passengers.

The total damage to Permanent Way and Rolling stock was estimated at about Rs. 45,000.

5. *Description of the locality of the accident.*—The derailment occurred on the single line at mile 101|17 between Taungzun and Mayangon stations. At the site of the accident the track is straight and lies in a long well drained laterite cutting from 5 to 20 feet in depth with side slopes of about 1 to 1.

6. From Taungzun station at mile 105¼ the line climbs over a summit at mile 102|2 and then falls at a grade of 1 in 300 Mayangon at mile 99¾.

7. The track which was fully ballasted consisted of new 60 lbs. rails with square joints laid in November 1927 on the original sleepers. The sleepers had not been re-spaced and about 5 per cent. required immediate renewal at the time of the accident.

8. *Consideration of the evidence.*—The train left Taungzun about 10 minutes late but there was no evidence that the Driver was exceeding the speed of 30 miles per hour allowed on this section and his average speed was only 16 miles per hour.

9. The first marks on the rails were recorded as parallel intermittent scrapes about 33 feet long and began 52 feet before the first marks on the sleepers.

The wheel marks on the sleepers were clearly defined for about 240 feet after which the track was destroyed and covered with debris.

There was no record of cross levels or of the point at which the flange mounted the rail before it dropped off on to the sleepers.

10. Between the marks on the rails and the marks on the sleepers the track had been opened out for packing and two coolies were working there just before the accident.

11. The track appeared to be up to the average of the rest of this branch and in the cutting it was on a solid laterite formation and adequately ballasted. The fact that the track was opened up for packing for a short length at the point of derailment does not in itself provide any direct reason for the accident.

12. There was no evidence that any gang men's tools, loose or broken parts of the locomotive or vehicles were found near or short of the point of derailment.

The only deficiencies recorded were in the damaged wagons and were probably caused by the accident and lost in the debris some distance beyond the point of derailment.

13. The last three bogie carriages and the Guard's van all passed safely over the point of derailment, and were subsequently removed by the Stone Train engine before the 33 feet intermittent scarpe marks on the rails short of the accident were observed.

It is probable that these marks on the rails were made by the braking of either the Guard's van or the stone engine. They may not therefore have had any direct connection with the accident.

14. The five leading wagons were all fully loaded. They were attached at Taungzun but there is nothing to indicate that the loading was uneven or that the load had shifted so as to have become uneven before the accident.

There was no evidence to show that the marks recorded on the wagon spring buckle were caused before the accident.

15. *Conclusions.*—From the marks I saw on the sleepers I am of opinion that one axle of one vehicle derailed first of all and ran along the track for about 200 feet before the other axle came off. The neighbouring vehicles were then brought off and destroyed the track.

16. From the Driver's statement it was the third vehicle that he saw capsizing and this is corroborated by the marks found on the sides of the second and fourth vehicles which were less severe than those found on the third.

17. The four leading goods vehicles capsized against the side of the cutting. This must have checked the speed of the train very suddenly and jammed the vehicles in rear across the cutting causing the serious damage.

18. The exact moment when the Driver put on his brake is uncertain, but probably it did not occur until the third vehicle was capsizing and by that time the result of the application of the brake was relatively immaterial.

19. There is no evidence to show that the third vehicle with 9,340 viss of boiled rice from Taungzun was unevenly loaded or that any spring buckle or springs were defective before the accident occurred.

20. Uneven loading or the shifting of the load in transit combined with a defective spring or a low joint in the track might separately or collectively have produced the initial derailment. While there is no proof of what was the actual cause of the accident the condition of the track was liable to emphasise any lurching set up by any weak spring or uneven loading and I consider it to be one of the chief contributory causes of the accident.

21. The train staff except in the matter of train protection were not to blame in any way, and the arrangements for first aid, relief and restoring communication were satisfactory.

22. *Recommendations.*—Sufficient new sleepers should be allotted with rail renewals to allow for the correct laying of joints and for the renewal of defective intermediate sleepers.

In this case the rail renewals were done last November, but the condition of the track was unsatisfactory when I inspected it on January 31st.

The sleepers had not been re-spaced to suit the longer rails, so that the rail joints though square did not occur regularly on or between the sleepers.

23. The Rules for the protection of trains after accidents are not sufficiently well known to guards and drivers and steps should be taken to remedy this at once.

BURMA RAILWAYS.

DERAILMENT OF No. 4 DOWN MAIL TRAIN BETWEEN YINDAIKKON AND KYAUKTAGA ON THE 28TH JANUARY 1928.

FROM MAJOR H. H. E. GOSSET, R.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A., BURMA, RANGOON, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, DATED THE 11TH MARCH 1928.

In accordance with Rule (7) of the Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the derailment of No. 4 Down Mail at Bridge No. 161 mile 110|1 of the Burma Railways on 28th January 1928.

2. I held a joint enquiry at the site of the accident on 29th January 1928, and the following Railway Officers were members :—

G. J. Bevan, District Engineer, Toungoo.

R. T. Power, District Traffic Superintendent, Toungoo.

J. H. Cardew, District Locomotive Superintendent, Toungoo.

C. N. James, Deputy Inspector General of Police (Railways) and R. G. B. Prescott, District Superintendent of Police, (Pegu) were also present.

3. A written statement was subsequently obtained from two of the passengers who were not present at the enquiry and also from the Chief Engineer, Burma Railways.

4. *Description of the accident.*—At about 3-12 on the morning of 28th January 1928, No. 4 Down Mail derailed about 24 feet north of Bridge No. 161 at mile 110|1 on the double line between Yindaikkon and Kyauktaga.

5. The engine crossed the first of the two 40 feet spans of this bridge, but falling off the second it pitched on its side between the tracks with its smoke box partially buried in the far bank. The tender became detached, turned upside down and crashed into the nullah bed close to the engine between the up and down line bridges.

6. The two luggage vans in rear were thrown across the gap after the tender coupling had broken. The van next the tender was twisted through 180° and fell on its back, while the other remained attached and alighted along side the first van, right way up and on the down track south of the bridge.

7. The two leading third class coaches crashed into the nullah and the carriage bodies were completely demolished as they capsized and overturned on top of the wrecked engine and tender.

8. The third passenger coach fell on its side with the leading bogie in the nullah and the rear bogie on the abutment, while the fourth carriage remained standing on the track with the leading bogie on the ballast just clear of the abutment.

9. The rest of the train was intact and remained on the track after pulling up in about 300 feet.

10. The driver, both firemen and twenty-three third class passengers were killed outright, and fourteen more third class passengers died in hospital as a result of extensive scalds and shock.

11. The guard and twenty third class passengers suffered from slight injuries and shock, but I understand all of them have since recovered.

12. The Up and Down lines were both blocked and the damage to rolling stock and permanent way was estimated at Rs. 60,000 but the total loss will probably not be less than one lakh.

13. *Rescue work and relief arrangements.*—Two European passengers (Messrs. Case and Rintoul) turned out at once and started rescue work independently by the light of lamps and electric torches. They were later on assisted by a Burman Judge and two other Burmese passengers in taking out the injured.

14. Lamps, two fire extinguishers and some tools were obtained from the guard's van and efforts were first made to rescue those passengers who were alive and who had not already extricated themselves from the three capsized coaches.

15. There was no sign of fire, but the extinguishers were turned on the wreckage of the engine, as steam was rising through the carriages and interfering with the rescue work and it was thought the engine had started a fire.

16. At about 4.00 a passenger (Mr. Wallace, late Railway employee) spoke from Kyauktaga on the control telephone to the District Traffic Superintendent and gave the first detailed information of the accident.

17. At about 5.15 a light engine and brakevan arrived bringing the station master, Sub-Assistant Surgeon and Dr. Abdul Karim (private practitioner) from Kyauktaga. Fires were lit and the injured were collected and had their wounds attended to in the nullah bed.

18. By 5.45 the gang coolies had arrived on the scene (after being called out by the Assistant Traffic Superintendent and Assistant Permanent Way Inspector trollying from Penwegon), and they helped Mr. Case to get out some of the remaining casualties.

19. The first accident special arrived about 7.00 with the railway Sub-Assistant Surgeon and breakdown gangs from Pyuntaza and began clearing the wreckage to get at the corpses.

Shortly afterwards the Toungoo accident special arrived with the District Officers.

20. The District Medical Officer and Traffic Superintendent from Toungoo now took over charge of the relief arrangements. The stock of 45 Up was brought to the site of the accident and thirty of the injured were evacuated to Kyauktaga hospital. Dr. Abdul Karim and Mr. Fane (Assistant Traffic Superintendent) greatly assisted the District Medical Officer with the actual evacuation work which was carried out by stretchers between the wreck and the train and from the train to Kyauktaga hospital.

21. Sixteen of the cases were sent off by special hospital train to Rangoon about 4 P.M., but fourteen had died in hospital by the 29th morning.

22. After the rescue work was completed, the Up line was cleared the same evening. Single line working was introduced with the passage of 1 Up express about 17-55, but the down line was not cleared until midday on the 21st February 1928.

Description of the locality of the accident.

23. The accident occurred on the Down line at mile 110|1 on the main line of the Burma Railways which runs south at this point. The length was doubled in 1925 and, as the piers are on wells, the Down line is 25½ feet east of the centre of the original bridge.

24. The Down line approach has a reverse curve of 2°, without any superelevation according to the usual practice. The track which is on a low bank is laid with 60 lbs. rails on teak sleepers and is fully ballasted.

25. After the accident on the 29th the permanent way was examined on both sides of the bridge. The north approach was checked and the largest variation did not exceed 1|16th of an inch.

Up to the point of derailment, which was 24 feet north of the bridge No. 161, the track was untouched and in excellent condition.

26. The bridge is on the straight and the derailment occurred at a rail joint just clear of the curve. The joint in question was square and had recently been oiled, the dog spikes were holding perfectly and the track was well maintained.

27. South of this rail joint the track was entirely destroyed. Both the rails were thrown clear to the east side of the track and crossed one on top of the other, and all the sleepers except the two next the joint had been broken up.

28. The two sleepers remaining south of the joint were shifted about 12 inches to the east and bore light paralled wheel marks clear of the rail seats. They had also been pushed forward some 3 or 4 feet.

29. Fish plates, fish bolts and nuts were found lying by the joint and also on the bridge. None of these parts showed any sign of damage or wear and the bolt holes in the rails showed no marks of shear or any other damage resulting from the accident.

30. The rails had been entirely ripped off the sleepers, and the bridge timbers that had not been destroyed were bunched up, with hook bolts intact, at the far end of the second 40 foot span.

31. Both the Up and Down bridges consist of two 40 foot plate girders and of brick piers and abutments on wells. There was a trickle of water in the nullah at the time of the accident and bed is about 20 feet below rail level.

32. The Down line girders were shifted and some cross bracing was bent. No serious damage was done and they were put into use again with a speed restriction as soon as the line was cleared.

The Up line south girder though shifted slightly was undamaged. It was immediately put right and opened for traffic the same afternoon.

33. *Conclusions.*—There were no signs of wear, shear or breakage of any kind on the fish plates, bolts, nuts or rails found lying about after the accident, so the only conclusion possible is that the fish bolts were deliberately removed both on the bridge and at the rail joint 24 feet north of the down line bridge, with the object of wrecking a train.

34. The position of the rails and of the wheel marks on the two sleepers at the point of derailment indicates that the line had also been slewed sufficiently to ensure a derailment.

35. The engine wheels at 30 miles per hour might be expected to travel some 7¾ feet before dropping on to the sleepers. They would therefore probably have hit and ploughed up the third and subsequent sleepers south of the joint.

The marks, recorded on the first two sleepers as cut slightly by several wheels, were probably made by the lighter vehicles in rear as the train slowed down.

36. Although the rear of the train pulled up in about 300 feet, the regulator of the engine was found in the normal running position and the vacuum brake had not been applied intentionally.

It was quite dark at the time and though the engine had a powerful electric head light, it is clear that the driver had not seen that the track was slewed. He would have been looking out for the signals at Kyauktaga at the time, but even if he had been watching intently he might not have been able to detect an opening in the track owing to the approach curves.

37. The train pipe of the vacuum brake must have broken almost at once. The guard described three bumps which probably occurred before the vacuum brake came into play. It appears likely therefore that one of the tender couplings broke soon after the leading brakevan had dropped off of the end of the rails on to the ballast, and the automatic application the vacuum brake thus saved the rest of the train from destruction.

38. There is no positive evidence to show that the speed of the train exceeded the 30 miles per hour allowed on this section of the down line.

The guard stated that he was running to time, though the Toungoo control and Penwegon records show that the train was 4 minutes late and making up time.

39. If on time, the speed would have been 24.5 miles per hour and if 4 minutes late the speed might have been 38.5 miles per hour, on the assumption that the time of the accident given by the guard as 3.12 was correct.

40. The Penwegon and Kyauktaga out reports do not agree, but in any case I do not consider that the speed of the train had any bearing on the accident.

If the slewing of the joint that had been opened out had been due to centrifugal force on the run out of the 2° curve, then the track would have moved on both sides of the joint.

41. Actually the north side of the joint showed no movement whatever, and I therefore conclude that the track south of the joint was deliberately slewed and not moved fortuitously by the accident or by any excessive speed of the train.

42. From the test carried out by a wrenchman on the 29th, a similar joint was opened out and the track slewed single handed in 13½ minutes. In this case one of the bolts was jammed and wasted some of the time.

A Down goods train had passed over the spot about 1¼ hours before No. 4 Down was due, so there was ample time for the opening out and slewing to be done by any intelligent non-expert person.

43. Though sums of money were carried by some of the passengers, no looting was reported. The reason for wrecking this train is at present still obscure, but the Magisterial and Police enquiries have, I understand, thrown some light on this aspect of the affair.

44. *Recommendations.*—Although both the Up and Down lines were blocked by the wreckage, no adequate steps were taken to protect the train under General and Subsidiary Rules 37 (1) and 86 (1)—(6).

The Guard (Moses) was the only survivor of the train crew and he did not take any steps to protect his train beyond sending two messages to Kyauktage.

45. Mr. Moses was considerably shaken. His evidence on the 29th was very confused on this point and he was later put on the sick list.

It was, however, quite clear that he was not thoroughly conversant with the rules and he took no active part on the rescue work. He did not call on the educated passengers to assist him or arrange help from the local gang huts.

46. With this exception everything possible was done for the comfort and relief of the injured and for the restoration of communication.

47. Mr. Case emphasised the fact that he needed a saw as well as tools to cut metal, and stated that he could not get them until the first relief train arrived.

A hand saw, hammer and chisel should have been found amongst the emergency tools in the guard's van under section 40 of Working Instructions, Part I, and though the rules 1 to 8 of this section are adequate, if carried out by guards and station masters, I suggest that a check of these equipments should be made occasionally by an officer.

48. A thorough working knowledge of the General and Subsidiary Rules is essential and steps should be taken to ensure that the more important rules will be well known and acted upon when the emergency arises for which they have been drafted.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

DERAILMENT OF H. H. THE MAHARAJAH OF BARIA'S SPECIAL TRAIN BETWEEN KANSUDI AND CHANCHELAO ON THE 26TH FEBRUARY 1928.

FROM MR. W. A. BUYERS, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, DELHI, No. 432, DATED THE 17TH MARCH 1928.

I beg to send herewith copies of the proceedings of the Officers' Joint Enquiry held in the above connection at Godhra on the 2nd March 1928 at which I was present.

2. Although this accident to a train carrying passengers was not attended with loss of human life, or with serious injury to persons or to property of the value of approximately Rs. 10,000 or upwards, I considered the nature of the accident was of sufficiently serious a nature for me to be in attendance at the enquiry.

3. *Description of the accident.*—On the 26th February 1928 at about 12 noon the special train containing H. H. The Maharajah of Baria and suite was derailed at mile 296 telegraph post 11 after leaving Kansudi station. Three of the passengers complained of simple hurt and after attention by the Medical Officer on the spot, were able to proceed to their destination.

The damage to rolling stock is computed to be approximately Rs. 1,000.

4. The special train was running from Ahmedabad to Piplod. The train had just left Kansudi station and while still between the up home and up outer signals, all four vehicles of which the train consisted were derailed with the exception of the leading bogie wheels of coach No. 3225 which was the coach next to the engine. Engine No. 348-H. remained on the track. No coaches were overturned.

5. After the derailment the drawbar of the leading coach snapped and the engine travelled a distance of 448 feet before coming to rest.

6. The class of Engine is the H. S. F.-4-6-0 type which is the usual class running on this section. There was no damage done to this engine neither were there any defects found.

7. After rerailing the coaching stock no defect was found in any of the vehicles except that due to the wheels ploughing through the ballast neither was any part of the undergear deficient. The wheels were gauged and found correct.

8. *Description of the locality of the accident.*—The site of the derailment is on the main line, which is single, between Kansudi and Chanchelao stations. There is a grade of 1 in 150 against the train immediately beyond the outermost points of Kansudi station. From these points the line runs straight for 1,360 feet and then there is a left handed curve of 1° radius in the direction the train was going. The derailment occurred on this curve.

9. On the morning of the 2nd March when I checked this curve the superelevation at the tangent point entering the curve from the Kansudi side was 1 in. Then at every 30 feet round the curve for the next three rails the superelevation was 1½ in. At the next 30 feet it was 1¼ in. and then 16 feet further on to the point where the derailment took place the superelevation was 1¼ in. The superelevation is run off from the tangent point of the curve along the straight at ½ an inch for every 30 feet.

10. The permanent way consists of 75 lbs. F. F. rails 30 feet long with 12 sleepers per rail, laid in 1891, with 5 hole fish-plates 24 inches long and fishbolts 1 in. diameter.

The sleepers are of the oval Cast Iron pot type and the rails are held by means of cast iron clips and steel wedges.

11. There was no abnormal wear on the rails round the curve.

12. On the day I inspected the road the inner rail had crept 2 ft.—4 in. towards Kansudi on the curve.

13. The ballast consists of good quality broken quartz stone laid to full section and 2 feet deep.

14. *Conclusions.*—From the evidence of the staff who inspected and checked the locomotive and coaching stock soon after the accident there was nothing to show that the derailment had been caused by any inherent defect in the rolling stock, and the coaches which I inspected at Godhra showed no signs of anything having been wrong with them.

15. In regard to any one tampering with the track such a theory can be ruled out because—

(*a*) there is a level crossing with a gate keeper 508 feet only from the site of the derailment. The gatekeeper would have noticed any person tampering with the line.

(*b*) The keyman of the local gang passed over the track just before the special train and reported that everything was in good order.

16. From the evidence produced at the enquiry it appears that this portion of the track has a bad history. There have been several occasions prior to the derailment when trains have had to be held up owing to the track failing by the fracture of fishplates. This points to the tendency of the road to creep abnormally and on the day I inspected the track the inner rail had crept 2 ft.—4 in. although the rails had been pulled back only a month previously.

This I consider is due to the pot sleepers in use not being able to hold the rails sufficiently tight to prevent them moving, a fault inherent in the design of that type of sleeper.

17. In my opinion, taking into account the history of the road and the fact that it was midday, the track was in a critical state of equilibrium and the vibration set up by the on-coming engine started a buckle on the curve which caused the derailment.

Recommendations.—The 75 lbs. road on the C. I. pot sleepers in use is a bad type of road for creeping. The numerous instances of the failure of this type of track in the Godhra area prove that there is always a danger of some defect occurring, which as in this instance took place as a train was passing over. It is high time that this type of road was replaced by a heavier and stiffer class of track.

BURMA RAILWAYS.

COLLISION BETWEEN DOWN LIGHT ENGINE No. F.-84 AND MOTOR LORRY No. R.A.-3913 ON 12TH MARCH 1928 AT HENZADA SHORE.

FROM MAJOR H. H. E. GOSSET, R.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A., BURMA, RANGOON, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 5TH JUNE 1928.

In accordance with Rule (7) of Railway Board's No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the collision between Down Light Engine No. F.-84 and Motor Lorry No. R.A.-3913 on 12th March 1928 at Henzada Shore, Burma Railways.

2. I was unable to attend the Officers Joint Enquiry held on the 21st of March 1928 at Henzada Shore and I received the papers on 7th May 1928 ; but I had previously inspected the Henzada District in February shortly before the accident occurred.

3. *Description of the accident.*—On 12th March 1928 at about 18-15 hours Down Light Engine No. F.-84, approaching Henzada Shore, collided with Motor Lorry R.A.-3913 on level crossing No. 1 at mile 106|17B on the Bassein Branch of the Burma Railways.

4. The Light Engine was approaching the Henzada Shore home signal and running tender foremost, when a Motor Lorry loaded with rice attempted to cross from left to right in front of it. The engine hit the lorry and pushed it about 100 ft. along the track and upset the five people sitting in driving seat. Of these two were killed outright, two died in hospital and one received severe injuries and suffered from shock and traumatic pneumonia.

5. *Description of the locality of the accident.*—There are two level crossings 269 feet apart between the home and outer signals of Henzada Shore station. The accident occurred at No. 1 which is about 170 feet short of the home signal. A Siding with points trailing takes off near the home signal, runs past No. 1 level crossing and terminates just short of No. 2 crossing. The line is single and unfenced, and the siding line was on the left of the approaching engine and the first line to be crossed by the Motor Lorry.

6. There was at this time only one gateman and gate hut for both level crossings. One of the gates at No. 1 was difficult to close and lock properly, and one gate of No. 2 was missing altogether.

7. The outer and home signals were lowered and both were visible from the road near gate No. 1 and the line is straight in the direction from which the engine was approaching.

8. *Factors for consideration.*—The evidence regarding the closing and locking the gates is conflicting. The gateman was hurried and admitted that the fastening was insecure, but it seems probable that the gates of No. 1 crossing had been both closed, but that one at least was subsequently opened before the accident occurred.

9. The man driving the loaded lorry had no licence, and four passengers were seen with him in the front seat joking and laughing while the lorry was approaching the level crossing. One other passenger was sitting on top of the load of rice and, seeing the engine approaching, he jumped off and escaped without injury.

10. The lorry partially ' stalled ' on the siding line and the driver probably changed gear, but failed to get clear of the engine. Although one or both the gates may have been opened, he undoubtedly committed a rash and negligent act in attempting to cross the line without looking at the signals which were down and clearly visible as he approached the gates. Furthermore he had no licence to drive and did not stop in spite of being warned by a spectator as he approached the level crossing gate.

11. *Conclusion.*—The gateman in charge of the two level crossings breached General and Subsidiary Rules 352 (1), (3) and (4), but the following extenuating circumstances must be noted :—

(*a*) One of No. 1 gates was broken and difficult to chain and lock, and one gate of No. 2 had been broken and removed altogether for some 2 or 3 months.

(*b*) Two sets of damaged gates 269 feet apart were more than one man could manage without breaching the rules in force.

Under these circumstances the gateman cannot be held entirely to blame and certainly cannot be prosecuted or dismissed and the responsibility must be distributed elsewhere.

12. The driver of the lorry was primarily to blame for rash and negligent driving without a licence, but died in hospital as a result of his injuries.

13. The lorry partially ' stalled ' on the level crossing and this was probably due to faulty maintenance of the roadway as well as bad driving and the gates of No. 1 and No. 2 crossings were badly maintained or missing.

14. These facts reflect grave discredit on the traffic or engineering staffs concerned. The Traffic Inspectors or Station Master either habitually breached General and Subsidiary Rules 245-(*a*), 354-(*a*), and 352 (4)-(*d*)-(*v*), or did not see that the Engineering Department maintained the crossing satisfactorily.

15. From my own observations of the Henzada-Bassein Branch last February, the maintenance of the gates and crossings was most discreditable to all concerned and could only induce a state of slackness in the gate keepers, which the inspecting staffs overlooked entirely or took no adequate steps to check.

16. *Recommendations.*—Special steps should be taken at once to make the *gate keepers and supervising staff appreciate their respective responsibilities.*

17. The state of the road surfaces and gates was not touched on by the enquiry committee, although this undoubtedly had a very important bearing on the case.

All relative facts should have been brought to light at this enquiry even if they were unpalatable to the officers concerned. In this case it was left to the Traffic Manager to find out subsequently what the condition of the gates, etc., was and this should not have been necessary.

The attention of all concerned should be drawn to this aspect of the case.

BURMA RAILWAYS.

COLLISION BETWEEN A MOTOR BUS AND LIGHT ENGINE K.-274 AT A LEVEL CROSSING AT MILE 103|22-P. OF THE RANGOON PROME MAIN LINE, BURMA RAILWAYS, ON 18TH MARCH 1928.

FROM MAJOR H. H. E. GOSSET, R.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A., BURMA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 9TH JULY 1928.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the Joint Enquiry held in connection with the collision between a motor bus and light engine K.-274 on 18th March 1928 at mile 103|22-P. of the Rangoon-Prome main line, Burma Railways.

2. I was unable to attend the district officers Joint Enquiry held on 23rd March 1928, but I had been over the line early in February at the time of the Agent's inspection.

3. *Description of the accident.*—About 1-10 hours on the morning of 18th March 1928 Down light engine K.-274 was going towards Rangoon at about 20 miles per hour, when it collided with a motor bus at the level crossing at mile 103|22-P. on the main line from Prome between Thayagon and Okpo.

4. The level crossing is on the main P. W. D. road and the gates should have been closed across the road. The bus driver however found the gates open as he approached from the Rangoon side and failed to observe the light engine approaching until the last moment.

He tried to accelerate and get clear, but the engine hit the back of the bus on the right side, killing three people and injuring eight.

5. The engine was stopped in about 200 feet and one dead body was removed from the tender wheels by the engine crew, but on the arrival of another motor bus the driver of the engine was afraid that the survivors and new arrivals might assault him, so he went on to Okpo and reported to the Assistant Station Master on duty.

6. No. 7 Up Mail reached Okpo about 3-0 and was at once sent to the site of the accident to render assistance. After picking up the killed and injured the line was cleared and the train reached Gyobingauk about 4-45, and the seriously injured cases were then taken to hospital.

7. *Description of the locality and other factors.*—The main line from Prome to Rangoon runs through Gyobingauk (mile 109) to Okpo (mile 101½) with a pick-up station at Thayagon (mile 105¾). The line is single with fencing placed on the slope of the bank just below formation level.

8. On each side of the level crossing near mile 103|22 the line is straight for about half a mile and on a four foot bank falling 1 in 1,000 from Gyobingauk. Outside the fencing there are bushes and shrubs up to the railway boundary and beyond this there are open fields with an unrestricted view.

9. Approaching from Prome the light engine came round a short 1° curve at mile 104|7 and had nearly half a mile of straight before crossing the P. W. D. road at mile 103|22.

10. The motor bus reached the level crossing from the Rangoon direction along a quarter mile of straight level road facing at an angle of about 135° to the track and with a gradual left handed bend crossed the railway line at right angles.

11. There are scattered trees on both sides of the road but the country round is level and cultivated. The approaches to the level crossing rise at 1 in 30 to rail level. The gates are placed in line with the fencing and are normally shut across the road.

12. The level crossing had one gateman, and his hut was just outside the fencing to the right of the motor and to the left of the engine as they approached the crossing.

This hut and also some temporary gang huts near by on the left of the track must have obstructed the views of the engine and motor bus at the last moment as they reached the crossing.

13. The night was pitch dark and the motor bus had the usual driving lights and a single electric bulb inside for passengers, while the light engine had its oil head light and a red side light at front and back.

14. The bus that met with the accident was the leading one of two with a party of clerks from Rangoon.

There were 16 passengers in addition to the driver and spare man, and the party left Rangoon at 15-30 hours. An unlicensed man had driven for some of the earlier part of the return journey, but the driver's last stop was at Thonze (mile 65¾) which, according to his statement he left at about midnight.

15. Although this level crossing was on the main P. W. D. road from Rangoon to Prome, the gates should have been closed and locked across the road under General Rules 352 (2), (3) and (4) as there was no special man on night duty. No lights were required on the gates under Subsidiary Rule 352 (*b*), but under General Rule 352 (1) the gateman should have been prepared to show a danger signal to any approaching train when the gates were open.

16. *Conclusions, etc.*—The gateman said he was assaulted with the starting handle of a motor car, and ran away after he had unlocked one gate, but there was no reliable evidence to corroborate this and little weight can be given in consequence to the medical certificate produced in support of this story.

On his own admission the gateman only locked one gate though both were closed when he went to bed at 21-00 hours, but this statement is contradicted by the rest of the evidence which goes to prove that the driver found both gates open about four hours later.

I conclude therefore that the gates had been left open and thus by breaching General Rule 352 the gateman was primarily responsible for the accident.

17. The engine crew stated that they did not see the motor bus approaching, although the driving lights and inside illumination should have been clearly visible from the footplate, until obscured at the last moment by the gate hut and temporary gang huts.

Even if he had seen lights on the road the engine driver had every right to assume that the gates would be closed against the road unless danger signals were exhibited under General Rule 352 (1).

I conclude therefore that the driver was not in any way responsible for the accident.

18. The engine crew were either not sufficiently on the alert while approaching the level crossing or else they agreed to say that they knew nothing about the motor car till they heard the noise of the collision.

The driver stopped the engine very quickly and with the second fireman took out one dead body from the tender wheels, but on the arrival of the second lot of passengers flashing torches, he feared some sort of retaliation and boarding his engine proceeded to Okpo without rendering any further assistance.

19. There is no evidence to corroborate the statements of the engine crew that the passengers were armed with ' dahs ' as well as electric torches. As the passengers were clerks on a pleasure trip from Rangoon, it seems a most improbable story and cannot be accepted.

20. There is no positive evidence to corroborate the statement of the engine crew that the oil head-light and the red side lamps at the front and back of the engine were alight at the time of the accident. There was a light inside the bus and the passengers were probably tired after their ten hours motor drive, and the approaching engine was only seen for a moment as the motor bus cleared the gate lodge just before the accident occurred. After the accident the driver and passengers were all very badly shaken and their recollections were naturally very vague. The benefit of the doubt must be given to the engine crew especially as the lights had been seen at Gyobingauk and there is no good reason why they should have gone out before the accident occurred.

21. Just before reaching the level crossing the motor bus and engine were approaching each other at about an angle 135°, so the driver of the motor would have seen the engine lights before he reached the gate hut if he had been on the look-out. He admitted he did not know the road and he had obviously had a long day after leaving Rangoon at 15-30 experiencing tyre trouble on the way. After a ten hours journey he was probably not sufficiently on the alert and clearly

did not realise that the level crossing existed until he had almost reached the open gates, and by then he could not have stopped in time even if he had wanted to. Owing to the approach ramps his speed had probably dropped somewhat and when he realised the engine was only a few feet away he could not accelerate sufficiently to get clear. I conclude therefore that the bus driver was partly to blame for the accident, in not approaching the level crossing with his bus under complete control and in not looking up and down the line for engine lights before he entered the level crossing.

22. *Observations and recommendations.*—Undoubtedly the gateman was primarily responsible for the accident and he was convicted under Section 101 of the Indian Railways Act by the 4th Additional Magistrate, Tharrawady, but it transpires from the judgment that the gateman only had one lock and one key at the time of the accident. He admitted that he fastened the gates and did not lock them at all, while a neighbouring cultivator stated that for about a year he had never seen the gates closed except by day on the approach of trains. These practices are entirely contrary to General Rule 352 and have obviously been going on for a long time.

23. It is quite clear that the gate keeper had not been properly supervised or kept up to the mark and this was the normal state up to the 5th February 1928, when the Agent inspected this section of the line and the laxity in closing and fastening gates was commented on.

24. As a result of this inspection the Chief Engineer issued special instructions to the staff in February, but it is clear from the evidence in this case that the Permanent Way Inspector had not taken adequate steps to ensure that the staff under him either knew their duty or had the correct keys to obey the orders. I therefore recommend that the attention of the supervising staff should be drawn to their responsibility and that adequate night and day inspections from the foot plate of an engine should be insisted on, so as to ensure that the rules nominally in force are properly carried out in actual practice.

25. As this was an Engineering gate I consider that the Assistant and Permanent Way Inspectors are also to blame in having permitted such a lax state of affairs to exist. If they have not already been punished, I suggest that a severe reprimand at least should be recorded in their history sheets.

26. This level crossing is an important one (*i.e.*, the main P. W. D. road and main line of the Burma Railways between Prome and Rangoon) and it is used by motors frequently by night as well as by day, so I consider that it should be reclassified at once so as to have lamps on the gates and a special man on night duty.

I also recommend that the temporary gang huts should be removed from the corner between the road and railway and that more thought should be given to the siting of gate huts. They should be built further back from the fencing so as to obscure the approaches to the gates of all important level crossings as little as possible.

27. Where road danger signals of the usual conventional type are not provided, I recommend that they should be put up at once on all important crossings used by motor traffic.

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The Hyderabad Book Depôt, Chaderghat, Hyderabad (Deccan).
Thakur and Co., Amraoti.

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Conclusions.

The lay-out outlined above requires to be inverted to follow in their direction of travel the derailing on the 19th April of the last three coaches of 38 Down. The train is running on the leftmost track, the down, quadrupling ; it is approaching Dum-Dum Junction ; is running to time ; the track ahead is clear ; all signals are in favour ; there is no check to the train ; there is no application of brakes ; but when his brakevan (the last coach) is between T. Ps. 4|19 and 4|18 the guard is thrown to the floor of his brake compartment by the violent jolting of his coach. He perceives that the rear part of his train is derailed and immediately after the coach next ahead of his is overturned and the train comes to a stand. Closer examination now shows that the last three coaches of the train are derailed. The first, bogie coach No. 4014, the 7th vehicle from the engine, is derailed of its *rear* bogie only and the *left leading wheel of this bogie is found broken* ; the second, bogie coach No. 3566, has fallen on its right side and is lying across the Up Quadruple track, the third, Bogie coach No. 4360, the 9th and last vehicle in the train and containing the guard's brake in the forward part, is derailed of both its bogies and has taken the Khulna branch line on which it is derailed.

The diamond crossing of the Down Quadrupling line and the Khulna branch at T. P. 4|15½ was responsible for the position in which the coaches were ultimately found, but the derailment began nearly a tenth of a mile before the diamond crossing was reached. There could only be two sources for the derailment, the clear track or the coaches themselves. The driver found the track in good condition when he was approaching Dum-Dum and he did not feel anything unusual until he had passed the point of derailment. The engine and six coaches passed safely over the track. It was a hot day and this was the hottest time of the day and it was possible for a buckling of the track to take place under the last three vehicles of the train after the first six had passed over ; but there is no evidence to suggest a buckle, the Permanent Way Inspector personally questioned by me states emphatically that he had no need to cut any rails to restore the track after the derailment, and even if he had there would be no proof that the rails did not close up after the accident where the track was seriously damaged. Also no derailment of this kind could possibly *cause* a fracture to a wheel such as that found in the broken wheel of the leading derailed coach.

The broken wheel cannot be explained as a *result* of the accident. Its existence fits in with the positions of the derailed coaches as the *cause* of the accident. The fracture in the wheel of the seventh coach apparently began in a pipe or fold, worked gradually round the hub, approximately in a circle, along the line of least resistance. The wheel, however, continued to hold together until it arrived very nearly at the point of derailment, when it suddenly failed and the derailment occurred, the wheels of the new three-wheeled bogie falling, one inside and the others outside, to the right of the rails, looking in the direction of travel. The track was damaged and the leading wheels of the eighth coach, when they came to the diamond took the cross-over instead of the down quadruple line. It is needless to follow the accident further. The whole accident occurred in about 800 feet when the train was travelling at about thirty miles an hour and was over in a fraction of a minute. I consider the evidence of the driver Mr. W. Roberts and the guard Mr. R. J. Williams reliable (except that Mr. Williams was wrong about the side on which the marks on the sleepers first appeared). Their evidence as to the train being to time and the signals being in favour is corroborated by the cabin assistant who was on duty in Dum-Dum cabin at the time of the accident. The chief evidence, however, is ocular and there is no uncertainty about the very complete fracture of a disc wheel of the 7th coach. The fracture was such as to completely separate the boss of the wheel, attached to the axle, from the disc of the wheel, attached to the rim, along the circle where the boss merges into the disc. For reference 2 photographs are attached.*

The Committee found that the fracture of the wheel was the cause of the accident and I agree with the finding. The failure appears to be of a most unusual nature and such failures, apparently, have not been looked for in the past. For this reason the committee could not apportion blame. But similar failures must be guarded against in future and I suggest that this case be brought to the notice of all Railway Administrations that they may take steps to guard against similar failures in future.

*Not printed.

BURMA RAILWAYS.

PARTING OF NO. 345 UP FAST GOODS TRAIN AT MILE 210|21 ON 21ST MAY 1928 AND SUBSEQUENT COLLISION OF THE REAR 35 VEHICLES WITH 1 UP AT THAWATTI STATION.

FROM MAJOR H. H. E. GOSSET, R.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, BURMA, RANGOON, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 8TH OCTOBER 1928.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the enquiry held by me in connection with the parting of No. 345 Up fast goods at mile 210|21 on 21st May 1928 and the subsequent collision of the rear 35 vehicles with 1 Up at Thawatti station on the Burma Railways main line.

2. I held the enquiry at Thawatti on 31st May 1928 and the following Railway officers were present :—

R. T. Power, District Traffic Superintendent, Toungoo.

J. H. Cardew, District Locomotive Superintendent, Toungoo.

H. G. Fitzherbert, District Engineer, Toungoo.

In addition further reports were obtained on the brake power of the brakevans employed and on the material of the broken coupling ; its factor of safety and previous testing.

Description of the Accident.

3. On 21st May 1928 at about 22-15 hours No. 345 Up fast goods parted at mile 210|21 near the top of an up grade about a mile from Thawatti station. The coupling between the 39th and 40th vehicles broke and the rear portion of the train consisting of 35 wagons ran back into Thawatti station and collided with 1 Up mail which had just come to a stop on the 2nd or through line.

4. The engine and tender of 1 Up were derailed, forced back over 110 feet and partly capsized. The luggage van next the tender was thrown into the air and fell on top of the stock of No. 340 Down goods which was standing on the station line, and the leading third class bogie compartment was derailed and the front end was smashed against two wagons of No. 340 Down goods. Three couplings in the rear of 1 Up were broken, the brakevan together with the two end wagons of No. 345 Up goods and also two wagons of No. 340 Down goods were slightly damaged.

5. After the parting the driver pulled on ahead for about a mile before he stopped. He found he had only 39 wagons including a brakevan and realising that part of his train had run back down the hill, he got the brakesman to pilot him and returned slowly to the Thawatti outer signals at a walking pace.

6. There were only five cases of minor injuries to passengers of 1 Up and they were all treated on the spot, but two of these were serious enough for admission to the Toungoo Civil Hospital.

7. The total damage to rolling stock and track was estimated at about Rs. 13,500 and all three lines were blocked by the debris. However the fourth line dead end was promptly slewed and temporary through communication was restored by 5-0 hours on May 22nd, though the track was not completely repaired until the morning of May 24th.

Description of the locality and other factors.

8. Thawatti is a three-line station at mile 210 on the main line between Toungoo and Pyinmana. The line there is single and runs to Htein-In, 4 miles to the north in the up direction, through undulating country covered with low trees and scrub. From the north points near mile 210 the grade rises 23½ feet in the first mile at an average grade of 1 in 225 and after 1,800 feet of level falls again to mile 212 at about 1 in 230.

9. The ruling grade for this section is nominally 1 in 200, but the grading is irregular and does not agree with the gradient posts, so that actually the steepest grade measured after the accident was 1 in 155 for 1,000 feet near mile 210¾.

10. From the centre of Thawatti station the grade rises slightly to the north points just beyond mile 210 where there is also a 4° curve to the right. Thence the average grade of 1 in 225 varies from 1 in 270 to 1 in 155 to mile 210|21 where the train parted, and the line, still rising, passes through a series of cuttings with left and right hand curves of 3° and 4°.

11. From the north outer signal near mile 210¼ the line is straight for half a mile and the country is more or less open as far as the first cutting and 3° left hand curve near mile 210¾, after that small trees and low jungle restrict the view very considerably.

12. The engine of No. 345 Up was one of the new ' D ' class and had a full load consisting of 74 wagons (105 units) weighing about 1,100 tons. This included two 14-ton brakevans for the end and middle of the train ; but actually the leading brakevan V. 1254 was the 19th wagon and the parting occurred between G. V. 5990 and G. V. 6143, the 39th and 40th wagons from the front. Out of the 74 wagons 60 had vacuum brake equipment (including all the 35 runaway wagons), but only the five next the engine were connected up for braking purposes.

13. The gross weight of the runaway portion was 583⅕ tons including the rear brakevan No. V. 6441. After the accident this brakevan was practically undamaged and was specially sent to be examined at Myitnge shops where it was found to be in good order and the brake power available was reported to be 8.40 tons with 40 lbs. applied at the brake wheel.

14. The broken coupling was an old type made by the railway of ' faggotted iron ' prior to 1912. The breaking stress was probably about 21—23 tons per square inch and the coupling was last tested on 1st March 1928 to a static load of 10 tons. The cross section at the centre was $3\frac{3}{4}'' \times 1\frac{3}{8}''$ and subjected to a bending stress in addition to the direct tension. At the shank there was only slight wear and the nett cross-sectional area was 1.64 sq. inches in direct tension.

15. There was no specific flaw, but the coupling was drawn out appreciably reducing the width to $1\frac{3}{16}''$ at the centre of the break. About 20 per cent. of the fractured surface showed a fine crystalline structure while the rest was fibrous and in places distinctly laminated. Practically all the crystalline surface was at the bottom of the section where the bending movement produces the greatest tensile stress in this type of coupling.

Consideration of evidence, etc.

16. The hook of the broken coupling dropped off and was found in the side drain of the cutting at mile 210|21 ; so the parting must have taken place at or near that spot as there is no evidence to suggest any other alternative, and the train was going little faster than walking pace.

The whole train would therefore have been still on the up grade with the engine near mile 211 on the 4° right curve, while the guard's brakevan would have been entering the 3° left curve in the cutting about mile 210¾. Under these circumstances the driver of No. 345 Up fast goods could not have seen the rear brakevan lights or the guard's signals, if any were given, until the whole train had cleared the 4° curve and the cutting beyond mile 211.

17. The driver of No. 345 Up said in his evidence that on reaching top of the grade near mile 211 the train went a bit faster, but that he could not see if it had parted until he reached the long straight beyond mile 211¼. On looking back and failing to see the rear brakevan lights, he then rightly assumed that the train had parted, and proceeded ahead for about a mile before he stopped and sent his first fireman back to investigate.

Finding he had a brakevan and brakesman and realising that the rest of the train must have been left on the up grade, the driver used his discretion and returned slowly to Thawatti outer signals with the brakesman walking ahead as pilot.

18. According to the leading brakesman of No. 345 Up, he knew the parting occurred by the ' shaking of his brakevan ', and on looking back he saw the guard's danger signal which he repeated to the driver. This story is not however corroborated by the engine crew and the guard's statement that he reversed his right hand brake lamp at once cannot be accepted in support of this, as the train was in a cutting on a left-hand curve, so the lamp could not have been seen by the brakesman in any case. I therefore accept the fireman's statement that

he found the brakesman in his van, and I infer from this that the latter did not know that a parting had occurred until the train had stopped and the fireman came along and told him.

19. The guard of No. 345 Up said he also realised the train had parted when he felt ' a sudden jerk ' and saw the engine headlight proceeding ahead. On finding the rear portion travelling backwards at 15 m. p. h., he immediately applied his hand brake and reversed his right side lamp, and kept putting his brakes on and off, till he jumped clear just before the collision occurred. I do not think the headlights could have been seen round the reverse curves in the cuttings and as the speed at parting was probably about 6 to 8 miles per hour, it would have taken nearly one minute on this up grade before the parted wagons stopped. About four more minutes would be necessary before a contrary speed of 15 m. p. h. could have been attained on the down grade even without any application of the guard's brake. Furthermore if the brakes had been applied at once and kept on all the time, the final speed on reaching Thawatti station could not have exceeded 12 m. p. h., whereas the driver of 1 Up standing at Thawatti thought the speed of the approaching runaway wagons was 25 m. p. h.

20. I cannot therefore accept the guard's evidence on these points as correct, and the statement he made to the Assistant Engineer at Thawatti directly after the collision agrees more with the timings and probabilities. I consider that the guard did not notice the parting at once, but thought the load was too heavy for the engine, and that the driver was going backwards deliberately in order to have another try. It was not till the speed reached about 15 miles per hour on approaching Thawatti station that the guard realised anything was wrong, and then he probably reversed his lamp and applied his brake before jumping off near the outer signal at mile 210.

The right side lamp was found reversed after the accident, but the brake was in the " off " position and this was most likely the case when the guard jumped off, as it agrees with his statement that he kept putting the brake " on " and " off ", so as not to skid the wheels.

21. From the timings given in the evidence No. 345 Up left Thawatti at 22.07 and took about 10 minutes on the up journey while the runaway wagons returned in about 6 minutes. The collision occurred at 22.25 after 1 Up had come to a stand in Thawatti station and as the discrepancy is only two minutes, the following speeds and times are probably more or less correct :—

No. 345 Up left the north points	at 22.08 (speed 4 m. p. h.)
Parting occurred	at 22.18 (speed 8 m. p. h.)
Rear portion stopped on grade	at 22.19
Rear portion collided	at 22.25 (speed 15 m. p. h.)

The driver of 1 Up probably over estimated the speed in the dark, as the maximum speed possible was about 18 miles per hour without any application of the brake. If the brakes had been put full on immediately after the parting, the maximum speed at the time of the collision could have been kept down to about 12 m. p. h. : but a collision could not have been avoided unless a coefficient of friction as high as .2 was available, and this is possible as the night was fine and the rails dry.

22. The broken coupling hook was not made of mild steel as stated at the enquiry, but was an old type forged by the railway before 1912. It had a plain rectangular section and was made of faggotted iron with an ultimate tensile stress of only about 21—23 tons per square inch. The nett section in direct tension at the shank was 1.64 sq. inches, so would stand a tension of 17 tons with a factor of safety of .2. The area at the centre was 5.16 square inches and at the break 4.82 square inches with the centre line of the section 3.375 inches above the direct line of tension in both cases, so that a large bending stress was added.

The static test made for this coupling was 10 tons and for this loading the maximum stress due to the direct tension plus the bending moment stress was 13.62 tons per square inch, which gives a factor of safety of only 1.5 for a dead load of 10 tons, whereas the ' D ' class engine draw-bar pull is a 10-ton live load.

23. The runaway wagons weighed 583.2 tons and on a grade of 155 a static tension of about 5.3 tons was all that this coupling was taking half way down the train, whereas it had been tested to 10 tons on 1st March 1928 shortly before the accident occurred.

The hook was certainly drawn out appreciably before it parted, but there were no flaws in the metal though its composition was uneven and seemed to be

a mixture of good fibrous iron and mild steel with the iron predominating in the upper part of the section.

24. There was no evidence to show that there had been any " snatching " or uneven pulling and other coupling hooks nearer the engine had heavier strains on them. The driver obviously had trouble in getting the load away up the hill from a speed of 4 miles per hour and may very likely have skidded his wheels when the last and heaviest 1,000 feet of his train was on the 1 in 155 grade. But the coupling must have been overstressed on some previous occasion, otherwise there was no specific reason for its breaking when it did with a comparatively light uninduced stress in the middle of the train.

25. 1 Up Express was expecting line clear and the Up points were set for it to go ahead on the through road. The station line was occupied by No. 340 Down goods and the third line had wagons stabled on it. When the runaway wagons were first seen by the engine crew of 1 Up, it was assumed to be a train backing into the third line, until just before the collision took place. The Assistant Station Master on duty was enquiring from Htein-In whether No. 340 Up had arrived as it was due there at 22.24, and so the arrival of the runaway wagons was not observed by the station staff and there was no chance of switching them into the third line.

Conclusion.

26. There is no evidence to show that the driver of No. 345 Up was to blame in any way. At the time of the parting the train was still on the up grade in a series of cuttings on reverse curves and the engine crew could not have seen the rear brakevan lights. On discovering the parting the driver pulled ahead for about a mile before stopping in accordance with General Rule 89 (1) (*a*) and Subsidiary Rule 89 (*b*). He used his discretion in returning slowly with a pilot to look for the rest of his train. Though nothing definite is laid down, I infer from Subsidiary Rules 85 (*a*) (*iii*), 89 (*b*) and General Rule 90 (8) that the driver should have proceeded at once to the next station and warned all concerned. In another recent case of a parting the driver proceeded ahead and the station in rear was warned in time to divert the runaway wagons, but nothing of that kind was possible in this case, as the collision occurred at 22.25, the time the driver should have reached Htein-In the next station ahead.

27. The brakesman and guard of No. 345 Up were not sufficiently on the alert and did not realise a parting had occurred, but I do not attach any blame to the former, except that his story was discredited. The guard however was much to blame as he assumed without any justification that the driver had failed on the hill and was deliberately backing. He did not apply his handbrake at once as he should have done under General Rule 89 (*i*) (*b*), nor did he attempt to pin down the handbrakes of the neighbouring wagons as he should have done had he known there was a parting.

28. If the guard had applied his handbrake at once as soon as his train stopped on the hill, he would have had at least one minute in which to pin down some of the handbrakes of neighbouring wagons directly the motion was reversed. I therefore conclude that the runaway wagons need never have got out of control and that a collision could have been avoided if the guard had acted promptly and decisively. The guard was very inexperienced and it was a dark night and, according to the station master at Thawatti, trains frequently failed to get up this hill, so that there were extenuating circumstances for the guard's erroneous assumption.

29. The broken coupling was undoubtedly too weak to take the 10-ton ' live ' draw-bar pull of the latest engines, but on the 39th wagon in this train it should not have broken and it must have been strained previously either in testing or use. It was an old iron coupling made before 1912 of plain rectangular section, even weaker than type ' A ' which was introduced in 1912. The factor of safety for both these old types with a 10-ton static load was less than 2, and this does not allow anything for snatches and live-loading ; whereas the latest ' H ' Section steel type ' C ' has a factor of safety of over 9 under similar conditions.

30. The ' D ' class engine was at this time quite new and the loads, brake power, etc., were still under investigation and general orders had not been promulgated on this important point. The rules issued to the Toungoo district and then in force, were that two 20-ton YV brakevans should be used *if available* with the full load of 110 units ; but as the 20-ton YV type van was only put on the line in March, the 24 then in use were not always available and in this case

two 14-ton V type vans were allowed instead. They were to be placed one in the centre and one at the end of the train, but actually the centre brakevan was not in this instance placed in the middle of the train. However this had no bearing on the accident as the parting occurred in the rear half of the train behind the 39th wagon.

31. The brake power thus sanctioned may have been sufficient for stopping trains under normal working conditions, but was insufficient in the case of a parting on an up grade of the ruling gradient. Even if the guard had applied his brake at once the wagons could not have been kept under adequate control, without extra assistance from wagon hand brakes, and a collision was therefore, practically speaking, unavoidable. This was undoubtedly due to the fact that sufficient brake power was not provided for the increased loads being dealt with by the more powerful ' D ' class engines.

32. The ruling grade was nominally 1 in 200, but actually 1,000 feet of 1 in 155 was measured after the accident. The engine loads were based on the assumption that the ruling grade was correct, and according to the station master, Thawatti, there had been many previous cases of engines failing to pull their loads on this up grade. The difference between 1 in 200 and 1 in 155 was very appreciable in this case as there was no question of a velocity grade and the driver obviously had trouble in getting away up the hill with his load, and the extra steepness for 1,000 feet was very likely the deciding factor and made him skid his wheels, which probably actually caused the snatch that finally broke the coupling.

Remarks and Recommendations.

33. No useful purpose was served by the driver of No. 345 Up going back in this case to look for his train. Subsidiary Rule 89 (*b*) lays down that in the case of a parting the driver should continue moving ahead until the guard's signals (from the rear portion of the parted train) are *clearly exhibited.* When the rear portion runs backwards the guard's signals cannot be clearly exhibited and generally speaking, no useful purpose can be served by going back in such cases, whereas timely warning may be given by going on ahead to the next station.

34. The rules in question do not deal with cases, but only with a parting and collision between the front and rear portions of the same train and I think that a further rule should be considered and added to cover similar eventualities ; although if adequate brake power is provided to stop any portion of any train on the ruling grade, accidents of this description should not be possible.

35. The guard should have applied his brake directly the train stopped and should have prevented the wagons running away by pinning down the hand brakes of neighbouring wagons before the speed got too high. I cannot find that anything is laid down for the guidance of guards under similar circumstances. In one recent instance however a fireman was able to jump out and pin down sufficient brakes to hold the train, while in another parting the guard did not make any attempt to pin down the wagon brakes and a minor collision took place.

It seems necessary that Rules should be formulated to deter guards from assuming that a driver is backing unless definite signals have been exchanged. The guard's brake should also always be applied for all stops, and in the case of a run-back the neighbouring wagon brakes should invariably be pinned down.

36. The manufacture of the weak " A." type coupling was only suspended at the end of 1927, and at the time of the accident there were about 5,000 weak couplings in use, but they are now being replaced as rapidly as possible. There is still a large number of coupling and buffer failures reported and the question of weak types of each should be carefully examined, as it appears that in the case of the coupling hooks this was not done in time to keep pace with the increase of engine draw-bar pull.

37. The guard was inexperienced, it was a dark night and he failed to appreciate the real situation and apply the wagon hand brakes as he might have done. In future similar cases must be catered for and sufficient brake power should be provided with the guard and brakesman to deal with any partings of this description, so as *to prevent any portion getting out of control on the ruling grade.*

38. In this case the ruling grade was exceeded and this undoubtedly was a contributory cause. Other partings have occurred on up grades and steps should be taken at once to check and where necessary correct all the ruling grades on main and branch lines.

NORTH WESTERN RAILWAY.

COLLISION OF NO. 45 UP PASSENGER TRAIN WITH A BANKING ENGINE IN KOTRI YARD ON 4TH JUNE 1928.

FROM MR. W. V. BUTCHER, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 65|28-783, DATED 23RD JUNE, 1928.

(1) In accordance with your telegram No. 2601-T. of the 5th instant to the Agent, North Western Railway, asking me to hold the enquiry into the circumstances attending the collision of 45 Up passenger train with a banking engine in Kotri yard on the 4th June 1928. The telegram was received by me on the evening of the 6th instant, in the meanwhile a Divisional Officers' enquiry had been held on the same date.

(2) I held my enquiry on the 20th instant. The following Officers being present :

H. F. Lockwood, Esq., Divl. Supdt.

A. K. Homan, Esq.
F. B. Martin, Esq.
E. M. Oram, Esq.
L. A. Coates, Esq.
} Divisional Officers.

(3) The statements taken during the Divisional Officers' enquiry were read over, and further questions asked, are recorded below the original statement. The statements and further questions were signed and acknowledged to be correct.

Description of the Accident.

(4) While 45 Up passenger was entering Kotri yard at about 5.15 hours it collided with an Up banking engine which had not cleared the block section.

Permission to approach for Up banking engine was tendered by Bholari at 4.25. This was replied to at 4.27 and private code T. H. L. U. in confirmation was given by A. S. M. Bell, Kotri, under his initial in column 6. Up banking engine entered the section at 4.30 and this was signalled to Kotri and recorded in column 7 of the Up train register. At 4.45 A. S. M. Bell, Kotri recorded the Up banking engine as having arrived in column 9 and confirmed it under his initial in column 12. Actually this engine had not arrived nor had the West Cabin been informed.

Bholari at 4.48 then asked for permission to approach for 45 Up passenger. This was replied to at 4.50 and private code E Q D A in confirmation given by A. S. M. Bell, Kotri under his initial in column 6. 45 Up passenger entered the section at 5.7.

Signals were subsequently lowered for 45 Up passenger when the Up banking engine standing at signals came in, but was overtaken by 45 Up passenger between the home signals and West Cabin on the Up line leading to No. 1 platform.

The shock of the collision parted the train engine of 45 Up and R. B. carriage next to the engine from the rest of the train. The collision caused passengers in various carriages of the train to be thrown about and 15 passengers are registered as having received slight injuries. All these passengers continued their journey in 45 Up passenger train after a detention of 95 minutes.

The total damage is estimated to amount to approximately Rs. 4,500.

Description of the locality of the accident.

(5) The site of the collision was on the Up main line leading to the passenger platform No. 1 at the Down end of the yard ; between the Up home and west cabin, see plan* attached herewith.

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*Not printed.

Kotri yard is situated at mile 105 from Karachi on the Karachi-Lahore main line section of the North Western Railway. The adjoining station on the Karachi side or down direction is Bholari.

Kotri is a cabin interlocked station. The line is straight and clear on approaching Kotri yard from Bholari side for about one and half miles.

There is a down grade on approaching Kotri from Bholari side for about one and half miles to the facing points in Kotri yard followed by a down grade further into the yard of 1 in 268 to beyond the site of the accident.

It was a clear moon-light night at the time of the accident.

Conclusions.

(6) After the banking engine had left Bholari for Kotri and it had been signalled to Kotri and recorded in the Kotri train register Mr. Bell, A. S. M., Kotri, who was learning the station yard working and doing the line clear work at the time, was informed by Mr. Jobe, A. S. M. on duty, that the banking engine had arrived. He, Mr. Bell, then recorded the banking engine as having arrived and was under the impression Mr. Jobe had informed the cabinman. At the same time Mr. Jobe was under the impression Mr. Bell being a passed A. S. M. had exchanged private number with the cabinman. The cabinman was therefore unaware of the banking engine being on the section. In the meanwhile the banking engine on arrival at Kotri Outer signal was held up. The cabinman at Kotri seeing the lights of 45 Up passenger coming telephoned the Assistant Station Master. On this information, Mr. Jobe, A. S. M. gave the slide and the cabinman lowered signals for 45 Up passenger. The signals being lowered the banking engine proceeded into the yard, but was overtaken, and run into by 45 Up passenger.

(7) The accident was caused through divided responsibility of Assistant Station Masters at Kotri. In that A. S. M. Mr. Jobe delegated train working responsibility to A. S. M. Mr. Bell which he was not authorised to do. A. S. M. Mr. Bell is also responsible in that he had no authority to take over any of Mr. Jobe's, A. S. M., responsibility in train working. By doing so, a state of divided responsibility which led to both relying on each other for the due observance of rules concerning the safe working of trains—resulting in neither satisfying themselves as to the arrival of the banking engine. I therefore hold Mr. Jobe, A. S. M., Kotri, on duty primarily responsible for the accident and Mr. Bell, A. S. M. as contributor.

Recommendations.

(8) In this particular case the Station Master and both Assistant Station Masters acknowledge the precautions usually taken before a newly appointed Assistant Station Master is allowed to take over independent charge of the working. This procedure is as follows :—

> The newly appointed Assistant Station Master has to study the working rules, obtain a thorough knowledge of the local conditions and layout of yards, etc. He witnesses the actual working of the permanent Assistant Station Master on duty and after satisfying himself that he has obtained a thorough knowledge of the working conditions, he informs the Station Master in writing that he is prepared to take up independent charge. On receipt of this the Station Master tests his working knowledge and if he finds him fit allows him to take over responsibility of the station working.
>
> It has been brought to notice that this procedure was not laid down in such detail in the old Traffic Manual nor is it embodied in the new Operating Manual. Paragraph 648 (*b*), page 210 of the old Traffic Manual, 1908, reads as follows :—
>
> " It is the duty of Station Masters to see that those relieving the permanent staff acquaint themselves with these rules before taking up duty."
>
> In the Operating Manual which supersedes this Manual, paragraph 1,043, Chapter XXVII, page 222, reads as follows :—

"*Responsibility of Station Masters for working of Staff.*

Station Masters are responsible for seeing that the staff working under them is acquainted with all the rules relating to its respective duties."

It is recommended that a definite paragraph in the Operating Manual be included as above defining the procedure to be gone through before a newly appointed Station Master or Assistant Station Master takes over independent working of the station or of his duties to avoid the possibility of a state of joint responsibility existing.

It should be clearly defined that the Assistant Station Master on duty has no authority to delegate any portion of his responsibilities and that the newly appointed Assistant Station Masters cannot be permitted to accept any responsibility while learning the work and must on no account take any active part in the arrangements for the reception and despatch of trains.

The engine of 45 Up passenger had not been fitted with a search light and is one of a small balance still remaining to be fitted. Work of fitting search lights on part of the balance is in progress and the material for completing the remainder has been applied for. It is recommended that the fitting of search lights to all engines be completed as early as possible.

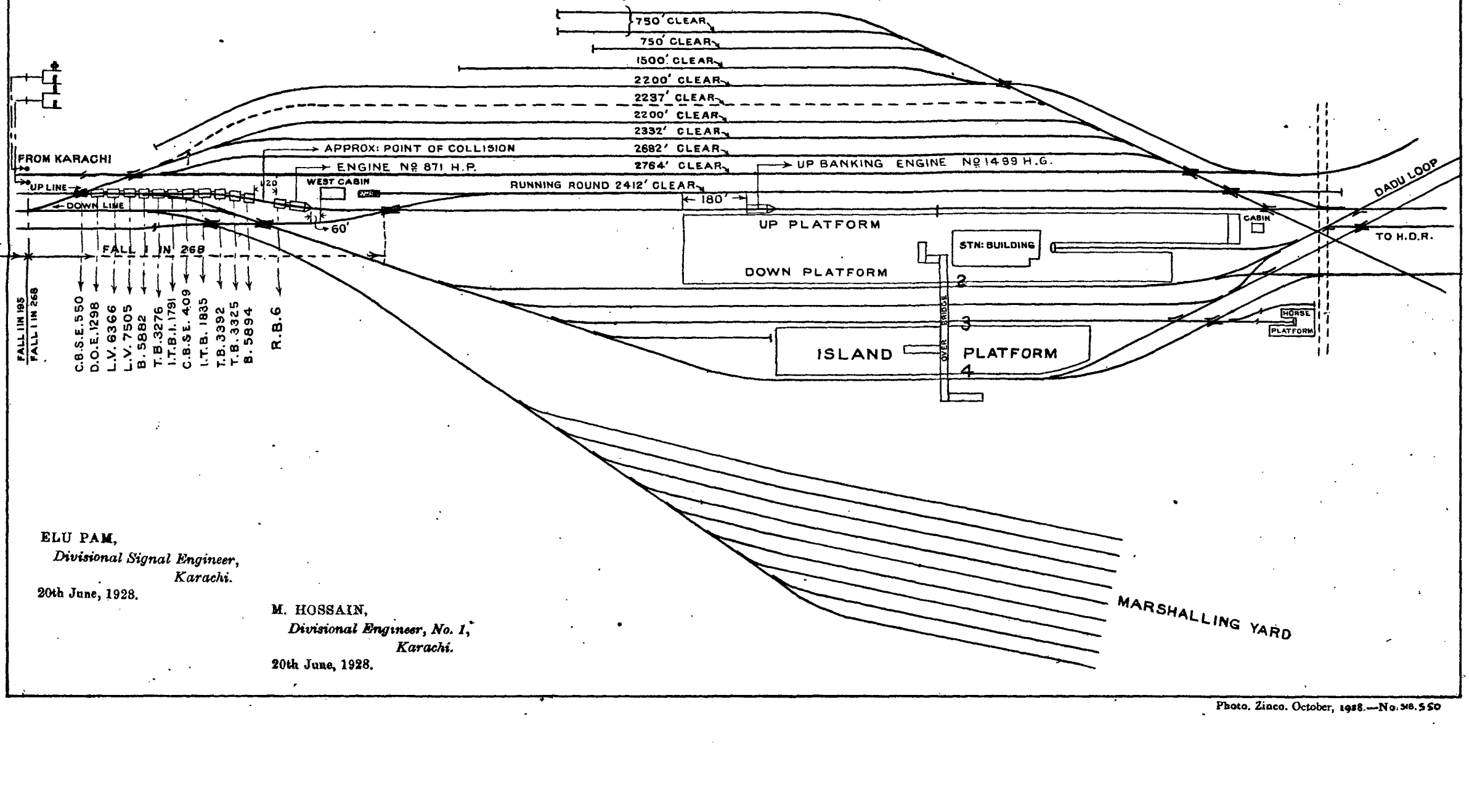
Document accompanying :—

Appendix A.—Diagram showing site of accident.

No. 403/1928 KYC

N. W. R.

SKELETON PLAN OF KOTRI
(CABIN INTERLOCKED)



ELU PAM,
Divisional Signal Engineer,
Karachi.
20th June, 1928.

M. HOSSAIN,
Divisional Engineer, No. 1,
Karachi.
20th June, 1928.

Photo. Zinco. October, 1928.—No. 548.550

EAST INDIAN RAILWAY.

COLLISION OF NO. 3256 DOWN GOODS TRAIN WITH NO. 1652 DOWN GOODS TRAIN AT TALIT STATION ON 18TH JUNE 1928.

FROM COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 27TH JUNE 1928.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith a report of the enquiry held by me into the circumstances attending the collision of No. 3256 with No. 1652, both Down Goods trains, at Talit station, East Indian Railway, on 18th June 1928.

2. I began the Enquiry at Burdwan on the 19th June and concluded it at Khana Junction after visiting Talit. The following attended the Enquiry :—

A. V. Venables, Esq., Divisional Superintendent, Howrah.

Ram Kishen, Esq., Senior Superintendent, Way and Works, Howrah.

R. F. Woods, Esq., Assistant Signal Engineer, Howrah.

G. R. Watling, Esq., Superintendent, E. I. Railway Police, Howrah.

Description of the Accident.

3. On the 18th June 1928 at about 0-11 hours No. 3256 Down ran into the rear of No. 1652, Down on the Down fast line at mile 71|7 between the Warner and Home signals of Talit station. *The engine of 3256 was overturned blocking the* Up slow and fast lines, and the *Down fast line ; the Down slow line was already* blocked by stabled wagons. *Driver Nawab Ali and fireman Imam, 3256 Down both* of Asansol, and guard B. K. Mazumdar, *1652 Down of Bandel were killed. 2nd* fireman Shakur, 3256 Down of Asansol *jumped off the engine and was slightly* injured. The engine of 3256 was damaged, *the brake van of 1652, in which the* guard was sitting was destroyed, and five goods vehicles badly damaged. The damage to Permanent Way was slight.

Description of the Locality and Working.

4. Leaving Khana Junction mile 74 the line curves slightly to the right as far as mile 73¼ whence it is quite straight up to and through Talit station, mile 71. There is a slight fall towards Talit. The line is quadrupled and looking towards Talit the lines in order from left to right are the Down Slow, Down Fast, Up Fast, Up Slow. The collision occurred on the Down Fast Line at mile 71|7.

5. *Khana Junction* is a fully interlocked station. An Assistant Station Master issues instructions for train movements by telephone to three cabins, West, Central and East :—

(*a*) *West Cabin* has double line Electric Block instruments and controls trains to and from the West end of the station and is not concerned in this accident.

(*b*) *Central Cabin* has no Block instruments but controls trains passing between West and East cabins by signals. It works the platform starters for down trains and has a good view of East Cabin Down Starter.

(*c*) *East Cabin* has double line Electric Block instruments and controls all trains to and from Talit. The signals for controlling down trains entering the block section towards Talit are a Starter near the cabin and an Advance Starter about 800 yards ahead. The locking between the Starter and the Advance Starter, and the Advance Starter and the Block instrument is such that, if Line Clear has been obtained and the Starter lowered and put back, it cannot be lowered again until a fresh line clear is obtained.

6. The signals for down trains at Talit are a Warner on a post by itself, a Home, and a Starter ; they are clearly visible from a distance of two miles. The cabin is fully interlocked and is provided with double line Electric Block instruments.

7. Khana Junction East Cabin and Talit are the two cabins chiefly concerned in this accident.

Evidence and remarks.

8. From the statement of the driver of No. 1652 Down it appears that he ran through Khana Junction with all signals off and was stopped at the Home at Talit which was against him. The switchman of the Talit cabin states that his signals were not lowered for the train because he was unprepared for it, not having received a train entering section signal from Khana East Cabin. After some delay the train was moving forward and had gone a few wagons length inside the Home when it was run into from the rear.

9. The guard of 3256 Down states that the searchlight with which the engine of his train was fitted was working well and this was corroborated by the 2nd fireman who also stated that the tail light on the brakevan of 1652 Down was showing red, and that it was drizzling rain.

10. There is no doubt that Line Clear was correctly obtained for 1652 Down and Khana Junction East Cabin Starter and Advance Starter were lowered for it to run through. The locking between the signals and the block instruments, which was in good working order, is such that either signal could not have been returned to danger behind No. 1652 and pulled off again for 3256, so they must have been taken off for 1652 and left in the ' off ' position. The only evidence regarding East Cabin Starter is that of the switchman, Central Cabin. He says he saw this Starter lowered for 1652, returned to danger, and again lowered for 3256. As the locking prevents this I do not accept this statement. He does not work the signal and probably did not look at it although he should have done so.

11. The Block Section in which the accident occurred extends from the Advance Starter, Khana Junction East Cabin to the Starter at Talit and the following are extracts from the Train Registers :—

No. of train.	Line Clear enquiry.	Line clear given.	Train Entering Section signal.	Line closed.
		Talit.		
1652	23.19	23.19	23.44	
		Khana Junction East Cabin.		
1652	23.16	23.19	23.25	23.36
3256	23.35	23.36	23.45	

The Register of Central Cabin records the time of running through of the two trains as 23-26 for 1652 Down and 23-44 for the 3256.

12. Both Registers agree on the time, 23-19 when Line Clear was given for 1652 Down, after that Khana East Cabin has four entries of which two are ascribed to the 3256 Down, which do not appear in Talit Register. The last entry in each Register probably refers to the same train entering Section Signal although the times differ by one minute and the signal is ascribed to different trains.

13. In East Cabin Register the four entries after 23-19 up to 23-36 appear to be false. The figure 25 in the number 23-25 had been altered by writing over and the Line Clear enquiry was sent a minute before the Line Closed was received. The Talit Register appears to be correct.

14. The switchman of Khana Junction East Cabin could not be examined, as he absconded after being relieved of his duties, so it is impossible to say exactly what happened in the cabin after Line Clear was obtained for 1652 Down at 23-19. It is probable that he went to sleep and did not wake up till 3256 Down passed his cabin.

Conclusions.

15. The cause of the accident was the failure to return the fixed signals to danger behind 1652 Down and subsequent failure to signal the train on the block instrument as laid down in Chapter XII of the General Rules for Indian Railways of 1906. For this Sujait Ali, the switchman on duty in Khana Junction East Cabin, is responsible.

16. I consider further that Ram Chandra Dubey, switchman on duty in Khana Junction Central Cabin, should have seen that East Cabin Starter was left in the " off " position, and taken steps to have it put " on ".

17. With a searchlight in working order and running on a straight line it is unfortunate that the engine crew of 3256 Down did not see the obstruction in front in time, but the drizzling rain may have prevented a clear view.

Recommendations.

18. (*a*) The importance of returning signals to danger immediately behind a train is well known, but a reminder for all the staff concerned should be put in the Weekly Gazette.

(*b*) Khana Junction is already supplied with enough safeguards, mechanical and electrical, to prevent an accident of this kind with ordinary care. Additional security would be provided by automatic replacers for Advance Starters and this might be considered.

EAST INDIAN RAILWAY.

DERAILMENT OF NO. 17 UP EXPRESS AT MILE 7|18 ON THE HOWRAH-BURDWAN CHORD, ON 8TH JULY 1928.

FROM COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 850-30-XIII-28, DATED THE 17TH JULY 1928.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of the enquiry held by me into the circumstances attending the derailment of 17 Up Express at mile 7|18 on the Howrah-Burdwan Chord, East Indian Railway on the 8th of July 1928.

2. Arriving at the scene of the accident by special train at 9-30 hours on the 9th July 1928 I began my enquiry by making an examination of the site.

The embankment and permanent way were in good order and the latter intact up to a joint on the Up line 66 feet on the Howrah side of Telegraph Post 7-18. The next rail in advance of the joint, of which the first ten feet could be clearly seen, was lying on its side parallel to its original position and just inside the track. This rail was on the outside of the curve. Beyond this and up to a 20 ft. girder bridge the permanent way was badly broken up by the accident and covered with debris so that nothing much could be seen of it. There were some sleeper ends protruding from the wreckage opposite T. P. 7|18 on which the clips and clip bolts were quite loose and there was no rail on the rail seat. There was a whole rail with a slight bend 6 feet from one end lying on the cess of the Down line and on the side of it away from the Up line close to T. P. 7|18. The first mark of the derailment of the 1238 Down Goods is on a sleeper 10 feet on the Dankuni side of T. P. 7|18 inside the track close to the right hand rail in the direction in which this train was travelling. I came to the conclusion that the first rail mentioned above had been moved from its alignment in the track, and probably the second rail had also been removed from the up line but this was not quite clear. I decided to take the statements of all concerned and accordingly continued my enquiry at Howrah on 12th July 1928 when the following were present :—

Mr. S. K. Haldar, I.C.S., District Magistrate, Hooghly.
Mr. R. G. Watling, Superintendent, Railway Police, Howrah.
Mr. A. V. Venables, Divisional Superintendent, Howrah.

Description of the Accident.

3. The 17 Up consisting of a rake of 9 bogies, with one four-wheeled coach and three goods wagons in rear, left Howrah at 22-20 on 8th July 1928 and was derailed at mile 7|18 at 22-42. The engine No. 1143-H.P.S., class (4-6-0), tender and the first five vehicles left the rails ; the others were undamaged. The first five vehicles were marshalled in order from the engine :—one bogie 3rd class and luggage van, two 3rd class bogies, one 3rd and inter class bogie, one upper class bogie. The 4th coach telescoped badly into the 3rd and most of the casualties were in these two coaches. 18 third class or inter class Indian passengers were killed, 8 seriously injured of whom two died in Hospital and about 24 slightly injured. The engine plunged off the line at a small bridge of 1-20 ft. girder and lay with its wheels buried in the mud at the toe of the slope. The European driver, Mr. Belletty, was killed and one fireman severely injured and one slightly. The engine was fitted with a searchlight.

The leading pair of wheels of the engine of the Down Goods, which passed the site at about 22-45 shortly after the accident occurred was derailed at T. P. 7|18 and ran for about two hundred yards before it was stopped damaging the nuts and bolts of the permanent way. This engine was rerailed at 5-30 and proceeded on its way. The Down Line was not fouled by the wreckage of the 17 Up on the Up Line.

Description of site of Accident.

4. The accident took place at mile 7|18 between Belur and Dankuni on the Howrah-Burdwan Chord on the Up Line. The permanent way consists of 90 lbs. F. F. rails on 14 A. J. trough sleepers to a 36 ft. rail ; the foot of the rail is fastened to each sleeper by two clips secured by bolts. Fish plates are 4-holed. A right hand curve of 2° begins at mile 7|15 and continues for some distance beyond Tele-

graph Post 7|18. From mile 6½ there is a grade of 1|1000 towards Dankuni. There is a small bridge of one 20 ft. girder 40 yards beyond the T. P. 7|18 on which rail level is eight feet above the bed level. The line is on a bank from three to four feet high. On both sides the borrow pits are full of water and there are crops growing outside the railway boundary.

Conclusions.

5. From the evidence of Mr. Venables, Divisional Superintendent who arrived at 1-45 hours corroborated by Mr. Ram Kishen, Senior Superintendent of Way and Works, and Mr. Bamjee, Superintendent of Way and Works, who arrived shortly afterwards, the fish plates of the joint on the outside of the curve 199 feet from the centre of the 20 ft. girder bridge had been removed and the next rail in advance was lying tilted over on its side inside the curve.

I accept this evidence and think there is no doubt that the moving of this rail was the initial cause of the accident.

6. (*a*) In the evidence of the above three witnesses and in that of Mr. McMahon, Transportation Inspector, and Gaina, the gang mate of the section, mention is made of the rail found on the cess of the Down Line near T. P. 7|18. According to the Permanent Way Inspector and the gang mate there was no rail lying there before. I thought that this rail had probably come out of the Up Line and asked Mr. Bamjee to pair off the rails as soon as they could be extricated from the debris. He did this and states in his evidence " on comparing the total length of the damaged rails taken out of the Up Line with the length of the damaged track I find that the rail in question must have been in the Up Line ". I think there is no doubt that this rail came out of the Up Line.

(*b*) The 1238 Down Goods passed through Dankuni mile 9, at 22-39 and came to a stand with its engine about 50 yards beyond the brakevan of the 17 Up, after running for about 200 yards with its leading wheels derailed. The Driver stated the rough running of his engine began after passing over the small bridge, and also that he felt his engine strike some obstruction. The mark of first derailment is 110 feet beyond the bridge, *i.e.*, 10 ft. before the train reached T. P. 7|18, near the spot where the rail above-mentioned was found after the accident. This rail lying on the line would easily cause the derailment of the engine, which has the 2-8-0 wheel arrangement. It had a bend in it 6 feet from one end which might have been caused by a blow from an engine.

(*c*) My conclusion therefore regarding this rail is that it was removed from Up Line placed across the Down Line and caused the derailment of the engine of the 1238 Down.

7. The line has been patrolled by night since the strike began and the evidence of the two patrolmen of the section from Dankuni (mile 9) to mile 7 was taken. They left mile 9 at 18 hours patrolling the Up Line and arrived at mile 7 at about 21 hours. Returning by the Down Line from mile 7 about 21 hours they had reached mile 9 when the accident occurred. The site of the accident is about half way between miles 7 and 9 so they would have passed it at about 21-50 and the tampering with the track must have taken place between 21-50 and 22-42 the time of the accident. This seems a short time but it is very easy to remove a rail from the A. J. sleepers and from an experiment made by Mr. Bamjee, the Superintendent, War and Works, it took 10 men 7½ minutes. From the statement of the Chief Controller, Howrah, the two trains which passed over the line just before the 17 Up were the Up Punjab Mail at 20-25 and the 109 Up at 20-47.

8. Regarding the speed of the 17 Up the guard stated that it was normal and Mr. McMahon, the Transportation Inspector of Power, who was travelling by the train, estimated it at 30 to 35 miles an hour. This is about right as the train passed Belur mile 4 at 22-33 and was derailed at mile 7¾ at 22-42 thus covering the 3¾ in 9 minutes.

9. (*a*) Dr. Repper, the District Medical Officer, Lillooah, had sent me a statement showing the action taken by him on the 9th July. He arrived on the scene of the accident at 1-45 with the medical equipment. The injured were attended to, taken to Howrah by train by 8-30, transferred into ambulances which were waiting and taken to Hospital. The delay in getting them away was due to the difficulty of extricating some of them from the wreckage.

(*b*) Before leaving the scene of the accident I counted seventeen dead and there were no more in the wreckage as far as I could see. One more body however was found after I left, and I have ascertained that two of the seriously injured have since died in Hospital bringing the total of the Indian passengers killed to twenty.

10. To sum up it appears that the rail mentioned in paragraph (5) above was moved from its alignment in the track and was the first cause of the derailment. Another rail mentioned in paragraph (6) was also taken out of the Up Line opposite Telegraph Post 7|18 and being placed across the Down Line derailed the engine of the 1238 Down Goods. These rails were removed by a party of men somewhere between the hours of 21-50 and 22-42 with the intention of train wrecking.

11. My finding in this case is that the derailment of the 17 Up Express on the 8th July was caused by the malicious removal of rails by persons unknown.

Recommendation.

12. The line is already patrolled by night and it is not possible to make any further recommendation. The intensity of the patrol might be increased, but this is hardly practicable throughout the line.

SOUTH INDIAN RAILWAY.

DERAILMENT OF NO. 2, BOAT MAIL (*EX*-DHANUSHKODI TO MADRAS) AT MILE 29|12, METRE-GAUGE MAIN LINE, AT ABOUT 23 HOURS ON 21ST JULY 1928.

FROM BREVET-COLONEL F. R. H. EUSTACE, D.S.O., R.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, OOTACAMUND No. S.-28|315, DATED THE 25TH AUGUST 1928.

In accordance with Rule 7 of the Rules for enquiring into and reporting on accidents forwarded with Railway Board's letter No. 120-T.|18, dated 6th April 1923, I have the honour to report the result of my enquiry into circumstances attending the derailment of No. 2, Boat Mail (*ex*-Dhanushkodi to Madras) at mile 29|12, South Indian Railway, Metre-Gauge, Main Line, at about 23 hours on 21st July 1928.

2. The enquiry was held at Egmore station on the 24th and 25th July 1928. There attended also Khan Sahib M. K. Farukhi Sahib, District Magistrate. Chingleput.

Description of the Accident.

3. No. 2 Boat Mail which had left Dhanushkodi on the morning of the 20th was 15½ hours late and had had an adventurous journey, having survived more than one attempt to arrest or derail it. The train consisted of 12 bogie coaches, the usual load. At mile 29|12, 2½ miles past Singaperumalkoil station, the engine left the track followed by three coaches, travelled about 50 yards and came to rest on its side. The first coach, a postal van, was not much damaged but the two following (III class) in which the casualties occurred, were wrecked. There were injured 8 passengers (one seriously) and three of the police guards, one of whom has since committed suicide after discharge from hospital. Those on the engine were not much hurt. The injured received prompt attention from the train staff and passengers among whom was a doctor. A doctor in the Up Mail which was waiting to cross at the next station about a mile ahead was brought to the scene and rendered assistance. Medical help also arrived by motor from Chingleput about an hour after the accident and the injured were conveyed to the hospital there.

4. The breakdown train arrived from Egmore at about 5 A.M., on the 22nd. Transhipment was complete by 10 A.M. and communication was restored by means of a slight deviation at 17-30 hours on the same date.

Description of the site of the accident.

5. The line from a point 240 yards before the place of derailment is straight and on a grade of 1 in 200 falling towards Madras. The train had passed 150 yards of this grade preceded by 150 yards of level before which had been about half a mile climb on 1 in 200.

The derailment occurred in a low sandy cutting. The country here is open, covered with low scrub jungle. On the east about 150 yards distant and more or less parallel to the line runs the Madras Chingleput main road.

6. The permanent way consists of 30 ft. B.H. 50 lb., rails on cast iron pot sleepers packed with sand, 12 to a rail. The fastenings are steel coil keys.

Conclusion.

7. The derailment was the result of deliberate tampering with the track.

8. When I inspected the site of the accident on the 23rd the wreck was still *in situ* and the state of the track was as described by witnesses Nos. 1, 4 and 5. A pair of loose rails were lying flat inside the track beneath the wreck of the 2nd and 3rd coaches amid the debris of the permanent way and had been pushed forward about 2 ft. from their original position. The fishplates from both ends had clearly been removed and most of these were found after daybreak among the neighbouring bushes. From the fact that no remains of damaged keys were found it appears probable that these had also been removed ; this, in the absence of the fishplates, would be sufficient to account for the accident. The rails would under such cir-

cumstances remain erect until loaded when the gauge would widen 5 inches at least. It seems likely from the position of the detached rails that on one side at least the inside jaws had also been previously broken but possibly the rail had been lifted therefrom. The night though fine was moonless and dark. The derailment was the first intimation the engine crew had of anything wrong ; I do not think it would be practicable for the driver to detect a defect of this kind in the track, *i.e.*, the removal of fishplates and keys even with a search light and a proper look out. It does not appear that the train was travelling above a moderate speed.

9. The track was found generally in good order with the keys tight and it had been inspected by the Assistant Engineer and Permanent-Way Inspector the previous afternoon.

10. The strike on the South Indian Railway had commenced the previous mid-night and the evidence shows that the Permanent-Way gang had been intimidated from working. The Inspector had arranged patrols but the patrol which left Singaperumakoil to go northwards at 18 hours and was due to return at mid-night did not do so nor did it meet the corresponding southwards patrol. The evidence of this patrol is to the effect that they met a party of 10 or 12 men after dark near the place of the accident and on being threatened they fled to their homes. The lock of the neighbouring gate lodge where tools were kept had been broken open and some were missing. The extraction of the coil key is difficult without practice. Though the gang in charge reject the keying hammer found near the track as theirs it is probable that the persons concerned in causing this accident were familiar with local arrangements as well as with the use of permanent-way tools.

11. The portable telephone carried by the guard gave useful service on this occasion.

SOUTH INDIAN RAILWAY.

COLLISION BETWEEN A LIGHT ENGINE AND A MOTOR BUS AT MILE 252|10, ERODE BRANCH, ON 25TH JULY 1928.

FROM BREVET-COLONEL F. R. H. EUSTACE, D.S.O., R.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, OOTACAMUND, No. S.-28|322, DATED THE 23RD AUGUST 1928.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I have the honour to submit herewith the report of my enquiry into the circumstances attending the collision of a light engine and a motor bus at mile 252|10, Erode Branch, South Indian Railway, on 25th July 1928.

2. The enquiry was held at Trichinopoly on the 2nd and 3rd instant. There attended also—

Mr. A. D. H. Hickie, Divisional Superintendent, South Indian Railway.

Mr. C. G. Slane, District Engineer.

Mr. F. S. Morris, District Mechanical Engineer.

Mr. Narayanaswami Ayyar, Inspector of Railway Police, and a Sub-Inspector of Police.

Description of the Accident.

3. While proceeding from Trichinopoly Junction to Trichinopoly Fort, light engine No. B-18 running tender foremost, collided with a motor bus on the Comerford Level Crossing at mile 252|10, (approximately 1 mile from the Junction) soon after 14 hours on the 25th July 1928.

The bus which was of the open type with cross seats, was struck by the left leading corner of the buffer beam almost opposite the driver's seat, immediately burst into flames, and entangled on the coupling, was carried forward along the track about 180 yards. All the occupants, eight in number, lost their lives from injuries or burns either on the spot or, later, in hospital. A crowd which soon collected injured the driver and firemen and tried to lynch the former but some Police arrived in time. Later the crowd increased and attempted to prevent the removal of the engine by pulling up a rail. Reinforcements of Police after firing dispersed them from railway premises. The corner of the buffer beam was bent but beyond this the engine sustained no damage.

Description of site of Accident.

4. The level crossing is a busy one (1st class) normally with single gates closing across the line with interlocked signals. On the 20th July, the day of the strike on the South Indian Railway, a crowd prevented the working of the gates and intimidated the men sent to replace the gatemen who had struck work. In consequence the gates and posts at this and also at two other similar crossings, were removed that afternoon, the signals put out of use and an " emergency order " for caution issued to drivers.

5. The line runs here nearly north and south through a populated area. The railway approach to the crossing from Trichinopoly Junction, *i.e.*, from the south is straight for 330 yards but the view of the road approaches is obscured by buildings and trees beyond about 30 yards on each side of the railway. It was found that the view of the eastern approach from the railway begins to open out at about 100 yards south of the crossing and at a distance of 70 yards the sight of the road as far as 32 yards from the railway becomes clear of obstructing trees.

6. The road runs straight for some distance on either side of the railway which it crosses on a skew of nearly 45°, *i.e.*, South West to North East and is ramped up to rail level for about 35 yards on either side on grades of 1 in 21-25. The motor bus concerned was travelling from the North East.

7. The railway is on a down grade of 1 in 127 to a point 300 yards of the crossing, thence level to 60 yards beyond, thence on a down grade of 1 in 195 through Palakarai Station, which is 350 yards beyond the crossing.

Conclusion.

8. The evidence available of what took place prior to the collision is unfortunately very meagre. Though a number of witnesses in the neighbourhood have testified to the whistling of the engine there is only one, Krishnaswami Naidu who actually saw what happened. There is no corroboration of this witness except that of Kuppuswami Pillai. These are both independent witnesses but whether their evidence is accepted as accurate or not, there is no doubt, I think, that from a distance of about 35 yards from the railway the driver of the bus could and should have seen the approaching engine. The west wind which is prevalent at this time of year is stated to have been stronger than usual on the day of the accident, but the locality did not appear to me to be particularly dusty. The dismantled gates and posts were conspicuous, lying on either side of the track, warnings of abnormal conditions at the crossing. The evidence points to the fact that the driver of the bus was moving recklessly and that he endeavoured to cross in front of the engine and I consider that the larger share of the responsiblity of the accident must therefore rest with him.

9. Rouse, the driver of the engine, who was examined in hospital, states that he knew the section well and also was aware of the removal of the gates and the necessity for special caution. He also states that he stopped at the Outer signal protecting the crossing at about 200 yards' distance and whistled and that he looked out on both sides and saw the level crossing clear and both he and the firemen state that thereafter approaching the level crossing a look out was kept on both sides. There is no reason to contest these statements or to doubt that the driver exercised ordinary caution. It seems clear however that at some short distance from the crossing possibly after the view of the road approach had opened out and the road appeared clear, the look out on the fireman's side of the engine at all events was relaxed. Five or six seconds' inattention immediately before the collision would have been enough.

10. The driver and the 1st fireman state that they were going at 10 or 12 miles an hour. Nevertheless judging by the damage done, I am of opinion that the speed at the crossing was somewhat greater than admitted by the driver. In any case this I consider was too fast. If in the exceptional conditions prevailing it was necessary to abandon the usual protection and it was not possible to arrange watchmen at this important crossing with the indifferent view of its approaches, the speed of rail traffic even though limited as it was on account of the strike should have been rigorously restricted to " dead slow ".

EAST INDIAN RAILWAY.

COLLISION BETWEEN NO. 168 DOWN AND NO. 300 DOWN GOODS TRAINS AT SAKALDIHA ON 6TH AUGUST 1928.

FROM COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE, No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 968|3-XIII|28, DATED THE 13TH AUGUST 1928.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of the enquiry held by me into the circumstances attending the collision of the 168 Down and 300 Down Goods trains at Sakaldiha on 4th August 1928.

2. I held the enquiry at Sakaldiha on the 6th August at which the following were present :—

Mr. G. G. Field	..	Superintendent, Government Railway Police, Agra.
Mr. S. A. Zamin	..	Deputy Magistrate, Benares.
Mr. R. E. Rutherford	..	Divisional Superintendent, E. I. R., Dinapore.

Description of the Accident.

3. The 168 Down consisting of Engine No. 782, 23 goods vehicles, a brakevan and an O. C. 1935 in the rear arrived at Sakaldiha at 1-15. The Down passing siding being occupied, it was shunted on to the Up line by order of the Control and then into the Up passing siding to give precedence to 14 Down and 15 Up. After the passage of these two trains, 168 Down was backed from the Up passing siding on to the Up Main Line, and thence was brought to the Down line by the East End crossover. After this, it was backing into the station when it was run into in rear by the 300 Down Goods in front of the Station Master's office. The 300 Down consisted of Engine No. 761 and 60 Goods vehicles fully vacuum braked. Mr. R. V. A. Stock, Assistant Superintendent, Way and Works, Moghalserai who was travelling in his Saloon No. 1935 in rear of 168 Down was killed, his cook Hira, severely injured and his peon slightly injured. Two of the train staff of the 168 Down, the driver and both firemen of the 300 Down were slightly injured, 11 vehicles including the Officer's carriage were badly smashed up and the engine of 300 Down was badly damaged.

Description of the locality of the accident.

4. Sakaldiha is on the Main Line of the East Indian Railway at mile 458, 12 miles east of Moghalsarai. The line is straight and level and runs roughly East and West. The stations on each side are Kuchman (mile 463) on the West side and Mahesua Block Hut (mile 454) on the East. The Down direction is from Kuchman to Mahesua. It is a double line station with lines at 12 feet centres. There is a Down Passing siding and a Goods shed siding off the Down Main line at the West end of the station, and an Up Passing siding off the Up Main Line at the East End. The Up and Down Main Lines are connected by crossovers one at the East and one at the West end. All points on the main lines are trailing. The station is worked as an " A " Class station with double line Electric Block Instruments. Signals consist of a Warner, Home and Starter in each direction. The Down Starter is 100 feet in advance of the points of the East Crossover. There is no Advance Starter.

Evidence.

5. From the evidence the sequence of events which led to this accident was as follows and may be divided into two phases :—

(1) the moving of 168 Down on to the Up line and berthing the train on the Up Passing siding.

(2) the moving of the 168 Down from the Up Passing siding back on to the Down Line.

6. *First Phase.*—The train arrived from Kuchman and came to a stand at the Down platform at Sakaldiha at 1-15. Line Clear was obtained for it to go on to the next station, Mahesua Block Hut, the Starter was lowered and the train had just started when owing *to orders being changed by the Control* the

Starter was returned to danger and the train stopped. These orders were that the train was to be kept at Sakaldiha and shunted to permit of the passing of the 14 Down and 15 Up Expresses. *The Down Passing siding being occupied* the train had to be shunted on to the Up line and into the Up Passing siding. Thereupon the Station Master at 1-20 issued a Shunting Order on Form T.-65 addressed to the driver ordering the shunt to take place by the " rear crossover " (*i.e.*, the West End Crossover). The guard initialled it apparently without reading it and sent it forward to the driver who, on an assurance from the pointsman that he was to do so, proceeded to draw ahead to cross to the Up line by the forward crossover (*i.e.*, the East End Crossover). The Station Master saw this being done but, as he was afraid of detaining 14 Down, allowed the shunting to proceed by the forward crossover and the 168 Down was safely berthed in the Up passing siding.

7. *Second Phase.*—(*a*) After the passing of the 14 Down and 15 Up the Assistant Station Master sent out the pointsman with the key of the Up Passing siding and the East End Crossover to bring the train out of the Up Passing Siding on to the Down Main line. He also gave him an *order written on a Telegraph Form* to be given to the driver. The points of the Up Passing Siding were set by the pointsman, the train backed and stood on the Up Main line, the pointsman reset the Passing Siding points and set the points of the East End Crossover and signalled the train forwarded on to the Down Main Line with a green light the guard repeating the signals.

(*b*) Arrived on the Down Main Line the train was brought to a stand according to the driver on receipt of a red light from the rear at about 2-35, according to the guard about a wagon length beyond the crossover points and according to the pointsman the train passed several wagons length beyond the Down Starter and was still going on. The Assistant Station Master said it was about 2-25 when, from the station platform, he saw the 168 Down pass the Down Starter. After coming to a stand it remained stationary for 3 minutes according to the guard and 5 to 7 minutes according to the driver. Then the guard signalled the train slowly back into the station to find out what was on the piece of paper he had received from the Assistant Station Master and to find out if Line Clear had been obtained.

(*c*) Meanwhile the pointsman having reset the East Crossover points had returned to the station and informed the Assistant Station Master that the 168 Down had gone. The Assistant Station Master says he also looked himself and saw no light of any kind. He then signalled the Out report for 168 Down to Mahesua at 2-30 and gave the Line Clear to Kuchman for the 300 Down at 2-31. The 300 Down left Kuchman at 2-36, the Home signal was lowered at 2-45 and the collision took place at about 2-55 just as the backing 168 Down came to stand in front of the Station office.

8. The evidence is conflicting about the order written on a Telegraph Form issued by the Assistant Station Master mentioned in paragraph 7 (*a*) above. The pointsman admits receiving it from the Assistant Station Master to give to the driver and says he handed it to the driver in the presence of the guard and told him verbally " that he might run on as the Assistant Station Master told me this ". The driver stated emphatically that he did not receive the written order.

The guard says he received this piece of paper when coming out of the Up Passing Siding and was told by the pointsman that he was to go to the Down Line. The piece of paper was so wet that it was reduced almost to a pulp and he was unable to read it ; against this the pointsman says he tied it up in his dhoti and it was not wet.

9. The driver of the 300 Down stated that the Warner at Sakaldiha was " ON " and he saw the Home in the " OFF " position when he was about a mile and a half from the Warner. He estimated his speed at 5 miles an hour at the time of the collision. He did not see a tail lamp on the 168 Down.

Conclusions.

10. *First Phase.*—The Assistant Station Master began well by issuing a Shunting Order to shunt by the rear crossover (*i.e.*, the West End Crossover). This is in accordance with the Traffic Working Order for crossing trains to the opposite line at stations where there are two crossovers. When he saw the train going towards the " forward crossover " he should not have acquiesced but he was influenced by a desire not to detain the 14 Down Express.

The guard was careless in not reading the Shunting Order before sending it to the driver, and the latter should not have accepted the pointsman's verbal instructions when he held a Starting Order on form T.-65 from the Assistant Station Master.

The only bearing this had on the accident is that, if the shunting had been carried out by the rear crossover, it is probable that the return to the Down Line would have been made by the same crossover and the accident would not have happened. The Assistant Station Master, hampered by changed orders from the Control and having his Down siding occupied, comes well out of this part of the operation and was badly served by the guard and driver.

11. *Second Phase.*—(*a*) The *written order* mentioned in paragraph 7 (*a*) could not be produced as it was lost in the wreck of the brakevan. I accept the Assistant Station Master's statement that it was an order written on a telegraph form addressed to the driver of 168 Down authorising him to pass the Down Starter at danger and proceed direct from the Up main line to the next station. It is necessary to explain here that in the ordinary course a Down train from the Down platform leaves the station on the lowering of the Down Starter, but this Starter cannot be lowered for a Down train leaving by the East Crossover direct from the Up main line because the locking does not allow it. A written order was therefore necessary to enable the train to pass the Down Starter at danger. I think the pointsman, Santokhi Mahto, gave the order to Guard Cooper, when he was setting the points to bring the 168 Down out of the Up Passing siding and the driver was at the other end of the train. The order may have been illegible, it was on flimsy paper and had been tied up in the pointsman's dhoti and perhaps exposed to rain. It is probable that he jumped to the conclusion that it was an order to enable him to pass the Down Starter at danger and regain the position on the Down platform from which he started and from there he would get line clear and start in the usual way. His subsequent action seems to point to this. As *Guard* of a train shunting in a station he was responsible for its movements under the orders of the Assistant Station Master. As he was not sure what these orders were he should have gone to the station and found out before moving the train from the siding. The *Assistant Station Master*, no doubt with the best intentions to save time, was ordering an unusual movement and should have supervised it himself so that there could be no misunderstanding.

(*b*) As regards the place where the 168 Down came to a stand when it returned to the Down Main Line, I think the pointsman's statement is more accurate than the guard's and that the train probably went some considerable distance beyond the Down Starter. It came out of the Up Passing Siding at 2-20 and allowing for backing, opening points, etc., it could arrive with the rear vehicle opposite the Down Starter by 2-30. The driver says he stopped at about 2-35 which means that even at slow speed he must have run a good distance beyond the Starter. Backing the train began at latest after waiting 7 minutes, *i.e.*, at 2-42 and the accident happened at 2-55. The space that could be travelled in this time at 3 miles an hour is 3432 feet. I think the train must have gone a considerable distance beyond the Down Starter, far enough to give the pointsman the impression that it was going away altogether. The *Guard* is chiefly responsible for this slack shunting and consequent delay but the *Driver* must take some of the blame.

(*c*) After seeing the 168 Down pass the Down Starter at about 2-25, and getting the further assurance from the pointsman that the train had left, the Assistant Station Master was justified in assuming that his written order had been understood and was being carried out. He was therefore in order in sending the Out report for 168 Down to Mahesua at 2-30 but he lowered his Home signal for the 300 Down too soon, at 2-45, in contravention of Traffic Working Order No. 18 which reads as follows :—

> " At " A " class stations except where special instructions are issued to the contrary, if Line Clear has been given to the station in rear when the Block Section in advance is obstructed all signals must be kept at danger and train brought almost to a stand at the Home when it should be lowered to allow it to draw up to the Starter.... "

If this order had been carried out the collision might have been averted or minimized and the *Assistant Station Master* is alone responsible for this breach of Rules. He should have awaited the " in report " of 168 Down at Mahesua which was due at about 2-42.

12. The *Driver* of 300 Down says his speed was 5 miles at the time of the collision but judging from the damage done it must have been 20 miles. With the Warner " ON " he should not have been travelling faster than 10 miles an hour.

13. The *Pointsman* did his work of opening and setting the points correctly. He gave the written order to the guard of the 168 Down instead of to the driver as ordered, but was more correct in so doing. He should have made more certain that the 168 Down had left before reporting to the Station Master.

14. (*a*) To sum up the Assistant Station Master issued an unusual order, and did not see personally that it was properly carried out. He did not keep his Home signal at danger when the 300 Down was approaching contrary to Traffic Working Order No. 18. He was however badly served during the first phase by the train staff of the 168 Down and last minute orders from the Controller at 1-15 in the morning.

(*b*) The guard showed slackness during the first phase in not reading the Assistant Station Master's written order on form T.-65, a lack of caution in bringing his train out of the Up Passing siding when he did not understand his instructions, and must share with the driver the blame for the delay in shunting on return to the Down Main Line.

(*c*) The driver is to blame for initiating the wrong movement during the first phase and lack of caution in carrying it on inspite of the Assistant Station Master's written order on form T.-65. He must share with the guard the blame for the delay in shunting on return to the Down Main Line.

(*d*) The driver of 300 Down showed lack of caution in approaching the station at high speed with the Down Warner at danger and the same may be attributed to the pointsman for not making sure that the 168 Down was proceeding to the next station.

15. *Finding.*—(*a*) The accident was caused by a misunderstanding between the Assistant Station Master, Sakaldiha and the Guard of the 168 Down as to the destination of the train when it left the Up Main Line on to which it had been shunted.

For this the Assistant Station Master, Sajjad Khan is primarily responsible with extenuating circumstances and *Guard W. A. Cooper* is responsible in a secondary degree for slackness and lack of caution.

(*b*) Driver C. R. Popovitz and Nasir Ali, and Pointsman Santokhi Mahto are to blame for lack of caution.

Recommendation.

16. The Traffic Working Order 150 (*e*) lays down that " when a train is shunted on to the opposite line at stations where there are two crossovers, the crossover nearest the rear of the train must be used ". A note should be added to make it clear that the return from the opposite line must be made by the same crossover.

17. Controllers should be instructed not to change their minds at the last minute if it can be avoided. The station staff should be able to adapt themselves to changed orders even in the middle of dark wet nights but as far as possible it should not be required of them.

18. It is for consideration whether passing sidings should be provided at Kuchman (mile 463) the next station to Moghalsarai owing to the increase of traffic.

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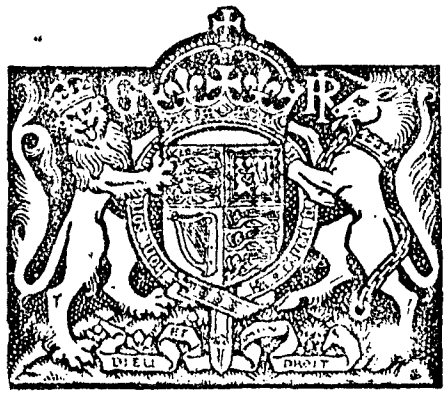

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BENGAL AND NORTH-WESTERN RAILWAY.

COLLISION OF NO. 103 UP B. AND N.-W. PASSENGER TRAIN WITH A SHUNTING ENGINE AT 0-5 HOURS IN BHATNI STATION YARD ON THE 25TH NOVEMBER 1928.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, No. 662-T., DATED THE 3RD JANUARY 1929.

As required under Rule 8 of the Rules for reporting accidents, I beg to submit my report on the accident to No. 103 Up B. and N.-W. Railway Passenger train at Bhatni on the 25th November 1928.

2. The accident occurred at 0-5 hours on 25th November 1928. I received the first telegraphic report at 13 hours on the 26th after 36 hours, an unusual delay which has been brought to the notice of the Agent. I immediately telegraphed the Agent that I proposed to hold an enquiry on the 27th instant and proceeded to hold it.

3. As the 27th November was the most important day of the Sonepore Fair, the District Officers were unable to attend my enquiry, but Mr. Hewitt, Assistant Traffic Superintendent, and the Inspector of Railway Police were present and the presence of the necessary witnesses was arranged.

4. The Heads of Departments of the Bengal and North-Western Railway subsequently held an enquiry on 29th November 1928 at which Mr. G. M. Harper, I.C.S., the District Magistrate, and Mr. Man Singh, Superintendent, Railway Police, were present. A copy of the report of this enquiry with the evidence and finding is forwarded as Appendix II.

5. I subsequently discussed this evidence and that taken by me on November 27th, with all Heads of Departments at Gorakhpur on the 15th December.

Description of the accident.

6. At 0-5 hours of 25th November 1928, No. 103 Up B. and N.-W. Railway Passenger train was admittted into Bhatni station yard with all signals lowered.

7. It was intended that the train should be received on No. 1 platform Line, but all the facing points had been set for No. 4 line just previously, to allow a shunting pilot to be attached to a rake of goods wagons standing on that line, and after the passage of the pilot the points had not been reset, bolted and locked for the passenger train as required by the working rules of the station. The Home and Outer signals were then lowered and No. 103 Up entering the station at a speed much above that permissible ran into No. 4 line and there collided head on with the Pilot engine No. 40 " O " standing attached to a rake of 49 goods wagons.

8. The damage to rolling stock was considerable—both engines were damaged, the leading brake-van telescoped into the leading Bogie 3rd class of the passenger train and both were entirely smashed up. The 2nd, 3rd and 4th vehicles of the passenger train, all bogie III class, were damaged and derailed. Twelve goods wagons were derailed and of them six were damaged. The total damage to rolling stock is estimated at Rs. 25,000. There was very slight damage to Permanent-Way.

9. The Drivers of both engines were injured slightly. In the leading bogie two passengers were killed and one seriously injured. Three passengers in the next bogie were slightly injured.

10. As a result of the collision, lines 2, 3, 4 and 5 of Bhatni yard were blocked. The Relief train from Gorakhpur was telegraphed for at 0-15, left Gorakhpur at 3-10 and arrived at Bhatni at 5-7 hours.

Line No. 2 was cleared by 9 hours and lines 3, 4 and 5 by 15-15 hours.

Description of the locality of the accident.

11. The collision occurred on the 4th loop of Bhatni station yard just opposite the end of the passenger platform.

12. Bhatni is a junction station at mile 270 of the Bengal and North-Western Railway Main Line from Katihar to Cawnpore.

13. The station is a non-interlocked station worked on Special Rules, a copy of which is hung in the Station Master's Office. The signals are a Home signal at the facing points worked from the platform, and an Outer signal lowered from the outermost facing points.

14. The Special rules for working the station require that when the Station Master on duty gives line clear for a train the following steps are taken for its reception :—

(*a*) The Station Master decides on which line he intends to receive the train, informs the Jamadar of his intention and gives him the special line badge for the particular line concerned.

(*b*) The Jamadar then goes out, bolts and permanently locks all facing points leading to this line and, when he has done this, gives the Station Master his Inward Badge as an assurance that he has done it.

(*c*) The Station Master on duty then exchanges signals with the pointsman at the outermost facing points and if he gets an all clear signal lowers the Home signal from the platform.

(*d*) The pointsman at the facing points, when he sees the Home signal lowered, lowers the Outer signal by a lever near his points.

15. At Bhatni station the platform is an island platform. The outermost facing points, at which there is a points indicator, are the take-off to the south side of the platform, the straight leading to the north of the platform and subsequently dividing into five loops. No. 1 line on which it was intended to receive 103 Up is the first loop on the north side and at the outermost points the train had therefore to take the straight. These points were correctly set and therefore the only points indicator provided gave a correct indication to the Station Master for the reception of 103 Up into No. 1 Platform line.

The evidence.

16. All the evidence shows that both Home and Outer signals were lowered for the reception of 103 Up and that facing points I and II were not bolted and locked before the lowering of signals as required by the rules.

17. As to why the points were not correctly bolted and locked there are two stories :—

(*a*) The story of the Assistant Station Master on duty, Babu Badri Pershad, who claims that the rules were rigidly followed and as proof of it a few minutes after the accident showed that he had the Inward badge to the Station Master, Sub-Inspector of Police and some of the passengers waiting on the platform to entrain by 103 Up.

(*b*) The story of the Jamadar Sahdeo Misra who was responsible for seeing that the points were properly bolted and locked. He declared he was ill and was asleep in the station verandah. He was not told that 103 Up was expected, the station bell was rung without his knowledge, and the crash of the collision 200 yards from him occurred without waking him. Finally after the collision the Assistant Station Master ran out of the office to the verandah, woke him up and demanded his Inward badge. He gave this up without protest or knowledge of the collision and the Assistant Station Master flung down the line badge to him which he picked up. He was thus saddled with the whole responsibility of the accident. In support of this statement he brought forward four witnesses. Three of these witnesses supported his statement in detail but when taken by me one at a time to show me where the Jamadar was sleeping when the Assistant Station Master took the badge from him, each was equally emphatic as to the exact spot, but each one pointed to a very different corner of quite a long verandah. The fourth witness denied all knowledge of the incident.

18. Finally there is the evidence of the driver that, though on the alert and that he passed the facing points at the permissible speed of 10 miles an hour, he was unable to avoid the collision or lessen its severity with a fully vacuumed

light train 1,150 feet after passing the outermost facing points and 727 feet after he took the first turnout that should have told him he was on the wrong line. His engine was equipped too with a high power headlight which should have shown him his facing points were set incorrectly.

Conclusions.

19. I hold the Jamadar Sahdeo Misra primarily responsible for the accident. I cannot believe that the crash of the collision, and the noise and confusion caused in the station verandah after the accident by the staff and passengers waiting to entertain by 103 Up, left him in such a sleepy condition that he meekly gave up his Inward badge to the Assistant Station Master Badri Pershad. If awake, with his service and knowledge of the rules, he certainly would not have given up the badge. Finally the witnesses he quotes, though well tutored the rest of the story, did not agree on the one point on which their evidence was tested and one witness did not support him.

I consider that he told the pointsman Ram Chunder to set the points without going out to lock them. He himself never left the station, gave the Assistant Station Master the Inward badge and went to sleep.

20. The pointsman Ram Chunder, the Assistant Station Master Babu Badri Pershad and Driver Power of 103 Up were all to blame in a lesser degree.

21. The pointsman Ram Chunder was in charge of points Nos. 1 and 2 and though he set points No. 1 correctly and I am convinced lowered the Outer signal for 103 Up he left points No. 2 wrongly set and so allowed 103 Up to turn into No. 4 line instead of keeping to the straight into No. 1 Platform line.

22. As regards the Assistant Station Master Babu Badri Pershad, though I am convinced that he exchanged badges correctly with Jamadar Sahdeo Misra, I consider that he complied only with the letter of the rule. It was his duty not only to get the Inward badge from the Jamadar as an assurance that all facing points were correctly locked but to see that his Jamadar went out and locked them. He may or may not have acquiesced in the Jamadar merely telling the pointsman Ram Chunder to go out and set the points, while the Jamadar went to sleep, but he certainly allowed the Jamadar to sleep in his verandah at train time and did not see that he went out to his points.

23. Finally I am emphatically of opinion that had Driver Power of 103 Up been on the alert the accident might have been avoided or at least the collision been so slight that there would have been no loss of life and little or no damage to rolling stock.

The B. and N.-W. Railway Departmental Finding (Appendix II) exonerates the driver on booked timings alone which are very often unreliable. The rules require that Driver Power should take the outermost points at 10 miles per hour. Had he done this, the 1,150 feet his train had to roll from the facing points to the point of collision, the three trunout he took, the normal partial application of his brakes to draw up at the station and his final application just before the collision would have reduced his speed to a shunting speed and the effects of the collision would have been negligible.

As it was, from the damage done, I estimate his speed at the point of collision as being at least 15 and probably 20 miles per hour. I have no doubt he applied his vacuum brakes when he took the last turnout and with this and his run of 1,150 feet from the facing points during which he would in the ordinary way apply his brakes partially to draw up at the station, I consider that he passed the facing points at 25|30 miles per hour.

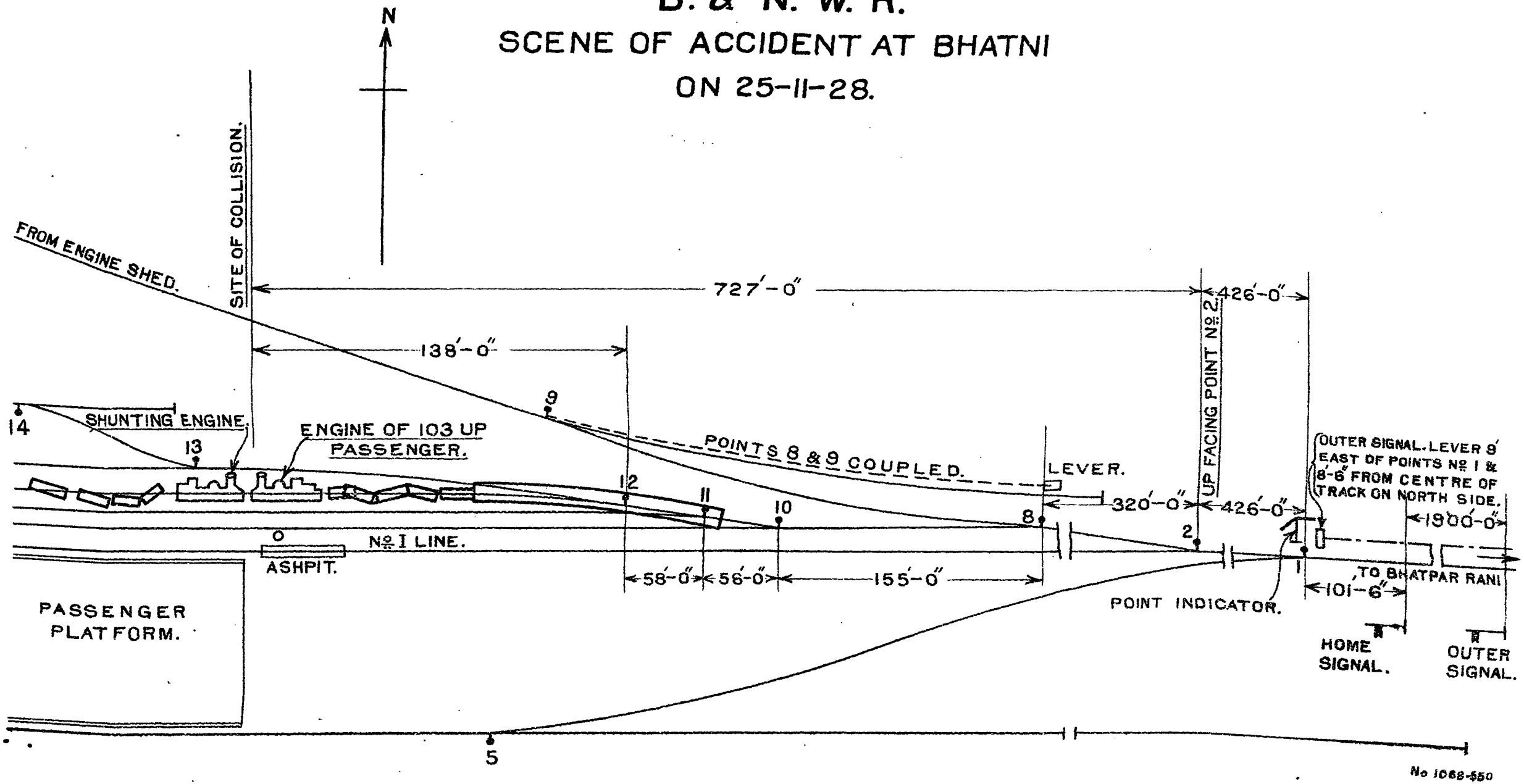
24. Mr. G. M. Harper, I.C.S., District Magistrate, Gorakhpur, has ordered the prosecution of the Jamadar Sahdeo Misra and I consider that the man should be prosecuted. The Railway Authorities are dismissing the Assistant Station Master Babu Badri Pershad and Pointsman Ram Chunder. My opinion as regards the Driver is being brought to the notice of the Railway authorities.

Recommendations.

25. It is strongly urged that some system of interlocking points with signals should be introduced at an early date on the main line at least of the Bengal and North-Western Railway. The traffic has long warranted it and the present programme of a few crossing stations and one junction a year is very inadequate. A much more rapid programme is necessary.

B. & N. W. R.

SCENE OF ACCIDENT AT BHATNI ON 25-11-28.



No 1068-550

ASSAM BENGAL RAILWAY.

DERAILMENT OF EIGHT VEHICLES OF 30 DOWN ASSAM MAIL AT LANGCHOLIET STATION MILE 377|2 ON 11TH DECEMBER 1928.

FROM MR. E. L. MANLEY, M.INST.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 2ND MAY 1929.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of a Railway Officers joint enquiry held to investigate the circumstances attending the derailment of No. 30 Down Assam Mail at Langcholiet station on 11th December 1928.

2. The following constituted the committee of enquiry which was held at Langcholiet station on 13th and 14th December 1928 :

Mr. Q. Z. Hussain, District Engineer, Lumding.
Mr. W. C. Blake, District Traffic Superintendent, Lumding.
Mr. A. Blake, District Locomotive Superintendent, Lumding.
Mr. E. W. Baker, Signal Engineer, Chittagong.
Mr. Md. Manik Ali, Sub-Inspector Railway Police also attended.

Description of the accident.

3. On 11th December 1928 at about 4-45 hours while train No. 30 Down Assam Mail, was travelling between Nailalang and Langcholiet a vehicle was derailed at mile 377|2. This vehicle was dragged to mile 375|18 where the derailed wheels hit the crossing and threw the two wagons, immediately following off the track capsizing them to the left of the line.

4. The dining car, which followed these wagons, was thrown off obliquely on the same side of the line and capsized on to them. The next coach, C compo 517, was thrown at right angles to the road, blocking both main and loop lines, with its leading end crashed into the front portion of coach No. 8144 which was following it and which in turn telescoped into the middle of the dining car. The next vehicle in rear of No. 8144 namely C. L. Compo 6018 was derailed of all wheels and 3rd class 8146 which followed had the front bogie wheels derailed. The dining car and C compo 517 were wrecked ; C. L. Compo 6018 and 3rd class 8146 suffered no appreciable damage.

The remainder of the train remained on the rails.

5. The engine with five wagons, the last of which was Dibru-Sadiya Railway I. C. G. 883, broke away from the remainder of the train and came to a stand with the engine, opposite the Main Signal, which is on the station platform, that is with a gap of about 450 feet between the two portions of the train.

6. Of the five wagons attached to the engine the only wheels derailed were the rear pair of the D. S. R. Wagon No. 883 which had made continuous marks on the sleepers from mile 377|2.

7. The order in which the first eight vehicles, behind the engine, were marshalled was three empty poultry vans, one loaded covered goods, D. S. R. 883 loaded covered goods, one partly loaded road van, one empty covered goods and the dining car. These were followed by eight passenger vehicles, the postal van, and brake van.

8. The train was vacuum brake coupled throughout but the three empty poultry vans Nos. 1566, 395 and 1560 and the D. S. R. I. C. G. 883 were only piped vehicles.

9. The dining car was occupied by the Car Manager, one cook and two servants. The Car Manager, cook and one khansama received slight contusions and abrasions ; the khansama being also slightly cut on the forehead.

Of the passengers on the train only two, occupants of 3rd class 8144, were hurt, one receiving a contusion on the foot and the other, a chaprassie, receiving a compound fracture of the first phalange of the left ring finger. These were taken to Lumding station, in the transhipment train, where they were attended to on arrival by the Medical Officer and Senior Assistant Surgeon ; after which they were taken to the Railway hospital at Lumding.

C Compo No. 517 was unoccupied.

The remaining coaches were occupied but none of the passengers in them were injured.

10. The total damage to permanent way is estimated at Rs. 1,700 and to rolling stock at Rs. 20,000 approximately.

Description of the locality of the accident and other factors.

11. The weather was foggy and it was dark when the accident occurred at 4-50 hours.

12. The total number of vehicles on the train was 18, equivalent to 27 four wheelers ; tonnage 344 tons against 366 tons permissible.

13. The booked speed for the train is 17 miles per hour and the maximum sanctioned speed is 25 miles per hour.

14. The station immediately preceding Langcholiet is 6 miles away and is called Nailalong. According to the guard the train left Nailalong station at 4-30 hours that is 15 minutes late and according to the booked running time should have passed through Langcholiet at 4-53 hours.

15. Between Nailalong and Langcholiet the line undulates slightly but the general tendency is to fall towards Langcholiet.

From mile 379.8 to mile 379.2 there is an up grade of 1 in 120 followed by continuous down grades of 1 in 125 and 1 in 175 from mile 379.2 to the first point of derailment. This portion of the line is not in the " Hill Section."

16. The site of the first point of derailment is on a right hand 4 degree curve.

Conclusion.

17. This is one of those cases where it is sometimes impossible to determine the cause of the accident exactly.

18. The inquiry committee in this case therefore arrived at their finding by a process of elimination after considering the following possible causes for the derailment :—

(1) Defective permanent way, (2) Excessive speed, (3) Uneven loading, (4) Sudden application of brakes, (5) Defective vehicle.

With regard to these possibilities :—

(1) The Committee trollied to mile 377|2 where one of the vehicles came off the rails and, after checking the gauge, superelevation and levels, found that there was nothing wrong with the track.

(2) After examining the train message books which corroborated the Guard's evidence regarding the timings, they were satisfied that the speed of the train at mile 377|2, where the first derailment took place, was not more than the sanctioned speed.

(3) By opening the wagon and examining the contents they found that the wagon was very evenly loaded.

(4) They found no evidence that brakes were suddenly applied before the derailment occurred.

But with regard to item (5) it was found that this was the probable cause of the accident for judging by the marks on the sleepers it appeared that one of the three wagons (883 D. S. R., 2419 A. B. or 3934 A. B.) which were found derailed in Langcholiet yard after the train had stopped must have come off the rails at mile 377|2 and been dragged to mile 375|18 where the other wagons were derailed and capsized. On carefully examining these three wagons, while no defect could be discovered in two of them, the third namely D. S. R. 883 was found to have the right trailing axle box and bearing spring broken. Moreover the left leading spring was found to be seven plated while the right leading spring was six plated. Furthermore examination of the fractured box showed the metal to be defective and that there was an old crack on the bottom of the box extending right up. They therefore found that this vehicle was the one which derailed at mile 377|2.

19. There is however the possibility that the train was actually travelling somewhat faster than it should have been, for though the guard in his evidence stated that the train left Nailalong at 4-30 hours the Assistant Station Master, Langcholiet states that the out report from Nailalong gave time of departure from there as 4-35 hours, and that the train was going a little faster than usual.

Be that as it may in the absence of reliable evidence the driver must have the benefit of the doubt ; but it is necessary to consider the effect of the speed of the train and the possibility of a too sudden application of brakes in relation to the types of vehicles and their order of marshalling.

The following action has therefore been taken :—

(1) The Assam Bengal Railway Administration on the finding of the Railway Inquiry Committee has instructed the D. S. Railway that springs of wagons must be all of equal size and strength or wagons will not be accepted.

(2) Orders have been issued by the Assam Bengal Railway Administration on the recommendation of my predecessor that empty or light loaded vehicles are not to be marshalled mixed up with heavily loaded vehicles on fast trains on the plain sections of the line. (Orders are already in force regarding the proper marshalling of such vehicles on the Hill section).

EAST INDIAN RAILWAYS.

NO. 174 VAN GOODS RUNNING INTO A MOTOR BUS AT LEVEL CROSSING NO. 84 MILE 72|20, AT PILKHUWA STATION ON THE DELHI BRANCH OF THE EAST INDIAN RAILWAY ON THE 2ND JANUARY 1929.

FROM MR. L. F. JACKSON, DEPUTY SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, No. 718-T., DATED THE 29TH JANUARY 1929, THROUGH COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAY, CIRCLE NO. 1, CALCUTTA.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I beg to submit a report on the enquiry I held on the 15th instant at Pilkhuwa station on the Delhi Branch of the East Indian Railway into a collision between 174 Down Goods train and Motor Lorry No. U. P.-1016-M.T. at Level-crossing No. 84 at Mile 72|20 of the Delhi Branch.

Description of the accident.

2. On the 2nd January 1929 the engine of 174 Down Goods from Ghaziabad to Hapur when approaching Pilkhuwa station at about 16 hours struck Motor bus No. U. P.-1016-M.T. at Level-crossing No. 84, Mile 72|20. The lorry was struck 6 inches from the rear end and the rear panelling was smashed and the lorry overturned. The bus runs from Delhi to Hapur *via* Ghaziabad and Pilkhuwa town and held about 14 passengers at the time. One passenger and the bus cleaner sitting on the rearmost seats were carried away and killed, six other passengers were more or less seriously injured and were sent to Hapur for medical attention, some other passengers were slightly injured and went to their homes without treatment.

Locality of the accident.

3. The accident occurred at Level-crossing No. 84, Mile 72|20 of the Delhi Branch of the East Indian Railway about a mile from Pilkhuwa station. The main metalled Delhi-Moradabad road at this point runs parallel to and about 600 feet from the railway. Opposite Level-crossing No. 84 there is a branch metalled road which crosses the railway at an angle of 60° at Level-crossing No. 84, runs through Pilkhuwa town, re-crosses the railway at Level-crossing No. 82 about 3|4ths of a mile from Level-crossing No. 84, and rejoins the main road opposite Pilkhuwa Railway station.

There is a considerable motor bus and cart traffic along the main road between Delhi and Hapur. All motor buses take the diversion to Pilkhuwa town, a prosperous place, to drop and pick up passengers so that Level-crossings Nos. 82 and 84 are both comparatively busy.

The train and bus approached each other at an angle of about 60° for about 1,000 feet from where the branch road left the main road. There are a few scattered trees intervening but no high crops and the view was clear for the Lorry driver for the full 1,000 feet and certainly for 500 ft. before he arrived at the crossing when the train was about the same distance away from it. The time was 16 hours and there was bright sunlight.

The evidence.

4. The evidence shows that—

(1) The bus driver was driving at an excessive speed when he took the turn off the main road for the branch road over the Level-crossing. Police Constable Chidda Khan on point duty at the turn endeavoured to check him but failed.

(2) The bus driver's attention was drawn to the approaching train by the passengers in the bus and he therefore was fully aware of the risk he was taking in endeavouring to cross in front of the train.

(3) The Level-crossing gates were both wide open and the Gateman Gulser was absent from his gate lodge.

Conclusions.

5. The bus driver was responsible for the accident. He had ample warning of the approach of the train and ample time to pull up his bus. The brakes when examined were in working order even after the accident. It would appear that he made no endeavour to pull up but rather speeded up to beat the train as he had apparently done already once on that journey near Ghaziabad.

The gateman was at fault for leaving his gates unlocked when he absented himself. He is alone in charge of the Level-crossing and in such cases gatemen have to choose between the risk of an accident of this nature, and the certainty of much abuse and probable assault at the hands of irate cartmen and motor drivers when they return from any absence and have to face those held up at the crossing. The man generally takes the risk this man did.

I consider the motor bus driver should be prosecuted and the gateman dealt with departmentally. The Police, however, had already taken action previous to any Railway enquiry in prosecuting both bus driver and gateman under sections 304-A and 101 Railways Act, respectively.

Recommendations.

6. It is strongly recommended that both Level-crossings 84 and 82 be made II class crossings with two men in charge of each. It is essential that at all such pucca road crossings, especially in a district where there is heavy motor traffic, there should be two men in charge and not a single man for the 24 hours. In this particular case the extra expense of providing the extra men can be met partly by abolishing gate No. 83 as the pucca roads 3|4ths mile apart at 82 and 84 do not leave any necessity for a third crossing in between. Crossing 83 may be converted into a turnstile or cattle crossing but even this does not seem really necessary.

I agree with the conclusions and recommendations of the Deputy Senior Government Inspector.

C. J. CLARKE, *Colonel.*

Senior Government Inspector of Railways, Circle No. 1, Calcutta.

Calcutta, 1st February 1929.

MADRAS AND SOUTHERN MAHRATTA RAILWAY.

COLLISION OF NO. 10 UP PASSENGER TRAIN WITH NO. 351 DOWN GOODS TRAIN AT DUGGIRALA STATION ON THE 21ST JANUARY 1929.

FROM COLONEL F. R. H. EUSTACE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 7, OOTACAMUND, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 29|16, DATED THE 13TH FEBRUARY 1929.

I have the honour to report in accordance with Rule (7) of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, the result of my enquiry held at Duggirala on the 26th idem into the accident which occurred on the 21st January 1929 at that station.

Description of the locality of the accident.

2. Duggirala is a road-side station with one loop, on the North East Section of the Madras and Southern Mahratta Railway, 13½ miles south of Bezwada. It is approached on gradients of 1 in 1,000 or less and the line is straight for some 7 miles in open country. The station is equipped with standard cabin interlocking, the homes and advanced starters being controlled by the Station Master from his office.

Description of accident.

3. No. 351 Down Goods arrived at Duggirala at 6-12 hours and was received on the main line. Four minutes later No. 10 Up Passenger *ex*-Bezwada came into collision just inside the down main starting signal.

4. The engines kept the rails but considerable damage resulted to both of them and to the first four vehicles of the passenger train three of which were fortunately empty carriage trucks and a luggage van. The underguard of 10 Up was seriously injured, both the engine crews and a Railway Police Constable received lesser injuries, but beyond three or four cases of minor cuts and bruises, attended to by the Assistant Traffic Superintendent who was on the train, passengers sustained no hurt. Both lines were blocked till 18-30 hours the same day and both were cleared by 20 hours.

5. The state of the weather at the time of the collision is of importance in this case. Fog is prevalent in this locality at this time of year just before and after sun rise ; sometimes so thick as to reduce visibility to 30 or 40 yards, at other times light and patchy. The evidence agrees that the morning in question was foggy but is conflicting as regards its intensity. The driver of the passenger train asserts that the mist obscured his vision of a signal at a telegraph post's distance. That the fog was thick is corroborated more or less by the cabin-man, the driver of the goods train, and the guard of the passenger train who all say that from where they were just after or before the collision they could not see the outer signal. On the other hand Mr. Marwah, Assistant Traffic Superintendent, says he saw the arm of the outer on alighting from the back of the train 3 or 4 minutes after the accident, and the Station Master asserts that he saw the back lights at about 6 o'clock, *i.e.*, a quarter of an hour before the accident, from the platform. The probability appears to be, as stated by Mr. Kotayya, an independent witness, that the fog was patchy and scattered ; sufficient just before the collision to obscure the outer from the starters and the home signals from the approaching train and, possibly, to cause the driver to miss the outer signal.

6. It is proved by the evidence that the driver of No. 1 Down Mail saw and reported this particular signal defective when he passed three hours earlier. The Station Master asserts that he proceeded to the cabin and saw this set right by the adjustment of the wire. His statement was given in an unsatisfactory manner and he does not agree in a material point with the cabin-man ; he admits that he did not send a man to the signal as he should have done and though he telephoned to the Control and the Station Master in rear that it was "all right", I do not believe either that he did anything beyond perhaps telephoning the cabin-man to slack the wire or that the cabin-man went to the signal. This signal was somewhat sticky when I inspected it five days later and it was evident that the wires were liable to be twisted and jammed.

7. The driver of the passenger train asserts that he steadied his train to a speed of 5 miles an hour at the outer signal, and, finding it " off ", with the warner at danger, that he steamed up to the home signals which he passed at 8 to 10 miles an hour, though they were then both at danger. Though corroborated to some extent by his crew this statement so far as his speed is concerned cannot be accepted ; it is contradicted by the guard of the train who states there was no slowing down until just before the collision ; it is not borne out by the Assistant Traffic Superintendent who considers the speed at the time of the accident at least 20 miles an hour. This figure judging by the effects of the collision which occurred 130 yards beyond the homes is not far from correct and the driver's story of slackened speed is, I consider, disproved by the fact that he had lost no time in the section for which the booked speed is 30 miles an hour.

8. The possibility of all signals having been lowered for the admittance of No. 10 Up Passenger on the main line and thrown to danger after the train had passed the outer must be considered. The only evidence pointing to this is that of driver Samuel of 351 Goods train and his evidence is of a negative character, *i.e.*, that he did not see one of the home back lights. There is no question of the interlocking being defective. Control to admit No. 10 Up could only have been given after the goods train had entered the station. No. 10 Up is a passenger train regularly admitted on the loop (platform line) and it is improbable that the Station Master and both cabin-men would have given control and lowered signals for the other line nor do I consider there was time to do so between the arrival of 351 at the station and of No. 10 at the outer. In any case the driver of No. 10 Up would not have been deprived of his warner indication.

9. There appear to be two alternatives, either that the driver of No. 10 Up found the outer off and took the home for granted or that he missed the outer and confused his land marks in the fog. In either case his speed was excessive and his driving reckless. With the warner at danger he should have been prepared to stop at the home. Furthermore he expected to enter the loop for which the regulation speed is 10 miles per hour. He acknowledges to have learnt from the driver of No. 1 Mail that this outer signal had been reported defective, and, although he had received no caution order, this should have made him doubly careful in approaching the station in thick weather.

Conclusions.

10. I conclude, therefore, that driver G. Fricker of No. 10 Up must be held primarily responsible for this accident by his neglect of General Rule 318 and of the indication of the warner, General Rule 10 (*d*).

11. That there was contributory negligence on the part of C. V. Chellapathy Rao, Assistant Station Master, Duggirala, who did not take sufficient measures to satisfy himself that the outer signal had been put in order after being reported as defective nor place detonators as the state of the weather demanded ; General Rule 36.

12. Chief Guard P. V. Garrad of No. 10 Up Passenger should have kept a better look out on the journey in foggy weather ; General Rule 275.

Recommendations.

13. Though this district is subject to fogs at this time of the year there appears from the evidence not to have been due observance of General Rule 36 which, as it stands, leaves it to the discretion of Station Masters to determine when it is necessary to lay detonators. It is recommended that definite instructions be issued for the guidance of Station Masters in this respect. The erection of fog posts at outer signals in situations liable to fog is also for consideration by the Administration.

BURMA RAILWAYS.

ENGINE OF UP GOODS SPECIAL RUNNING INTO A MOTOR BUS FULLY LOADED WITH PASSENGERS AT THE LEVEL CROSSING AT MILE 136|6 BETWEEN THATON AND AUNGSAING ON THE PEGU MARTBAN BRANCH OF THE BURMA RAILWAYS, ON THE 22ND FEBRUARY 1929.

FROM MR. E. L. MANLEY, M. INST., C.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, BURMA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 1ST APRIL 1929.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923 I submit herewith my report on the enquiry held in connection with the collision between an Up Goods Special and Motor Bus No. RA-9585, on 22nd February 1929 at the Level Crossing at mile 136|6 between Thaton and Aungsaing on the Pegu-Martaban Branch.

2. I attended the joint magisterial and railway enquiry held at Thaton on 5th and 6th March 1929 and the completion of the railway enquiry at Rangoon on 8th March 1929. I also inspected the site of the accident by day light with the District Engineer on 5th March 1929 and with him and the assistance of the District Traffic Superintendent and Assistant Locomotive Superintendent made a trial with an engine and motor car, at the level crossing, during the night on 5th March 1929 to test visibility, scope of the head lights, etc.

3. The following were present at the enquiry at Thaton on 5th and 6th March 1929 :—

Major F. L. Roberts, I.A., Deputy Commissioner, Thaton (for part of the time on 5th March 1929 only).

U Thin Mua U, Sub-Divisional Magistrate, Thaton.

Mr. G. J. B. Beven, M.B.E., District Engineer, Lower District, Rangoon.

Mr. S. C. Bryant, District Traffic Superintendent, Moulmein.

Mr. W. A. Burne, Assistant Locomotive Superintendent.

Mr. S. Catchick, Inspector of Railway Police, Pegu.

The following were present at the completion of the railway inquiry at Rangoon on 8th March 1929 :—

Mr. G. J. B. Beven, M.B.E., District Engineer, Lower District, Rangoon.

Mr. S. C. Bryant, District Traffic Superintendent, Moulmein.

Mr. W. A. Burne, Assistant Locomotive Superintendent.

Description of the accident.

4. On 22nd February 1929, at about 1.50 hours, the engine No. F.-40, of an Up Goods Special while running between Thaton and Aungsaing collided with a road motor bus No. RA-9585, at the level crossing at mile 136|6 on the Pegu-Martaban Branch.

5. The level crossing is on the main P. W. D. road connecting Thaton, the headquarters of the District, to Martaban. From its importance this is an A class level crossing as specified in Railway Board's No. 709-Tech., dated 20th May 1928, though it has not yet been brought up to that standard of equipment.

The gates should have been closed across the road but the bus driver found them open as he approached from the Aungsaing side. His bus was run into by the engine of the Up Goods Special just as it was on the point of getting clear of the track on the Thaton side. The gate keeper was not on duty at the gate.

6. Though the general direction of the main P. W. D. road on which the bus was travelling is straight and at an acute angle to the alignment of the railway, in order to simplify the level crossing, the road has been diverted where it approaches the line, on both sides of the track, so that the actual crossing is at right angles to the railway.

The motor bus was therefore approximately at right angles to the locomotive when the collision took place. It was hit in the rear portion, slewed round through 90 degrees and forced a few feet in the direction the train was travelling. It came to rest against the railway fencing, which was on the shoulder of

the bank, with the front of the car facing the direction from which the train had approached.

7. The bus, which was a new one, had been photographed shortly after the occurrence in connection with the owner's claim for insurance. I therefore obtained copies of these photographs and enclose one copy of each. At the time of my inspection the bus had been removed but the photographs show that the superstructure of the body work above floor level had been entirely demolished.

8. The collision resulted in the death of one woman, serious injury to 2 other women, and slight injury to 7 women and one man all of whom were passengers in the bus.

As the engine of the train was an old F class fitted with only a steam brake and a hand brake, there being no vacuum brake at all, before it could be brought to rest the whole of the train had passed the site of the accident some little distance. It was immediately backed so that the injured could be taken into the Guard's van. This having been done the train proceeded to Aungsaing station, which was just ahead, arriving there at 3.15 hours. The goods wagons were then placed on the third line and the engine with the Guard's van containing the injured, returned to Thaton arriving there at 4.5 hours. The station master Aungsaing had already wired to the station master Thaton to be in readiness with a stretcher and on arrival at Thaton a bus was requisitioned and the injured taken to the Civil Hospital.

9. None of the staff of the train were injured.

10. The total damage to the locomotive was Rs. 5, and to the railway fencing Rs. 3.

11. The weather was clear and it was within a day of full moon.

12. A sketch of the site of the accident is enclosed.

13. The train was said to have been travelling at about 18 miles per hour. This is probably correct as the level crossing is situated approximately 2½ miles from the centre of Thaton station and the train stopped there. Moreover the engine was an F class with a full load.

14. The driver of the train did not see the bus until he was practically on to it but saw the lights of other buses approaching further down the road.

15. The train engine had no headlights, but had the two side lights. This is allowable.

Description of the locality of the accident and other factors.

16. The railway from Pegu (mile 46.5) to Martaban (mile 169.5) runs through Thaton (mile 133.75) and Aungsaing (mile 137.5). The line is single and fenced. The fencing is placed just below the shoulder of the bank.

17. On each side of the level crossing at mile 136.25 where this accident occurred, the line is straight for more than a mile.

18. The photographs show that the road surface was in excellent condition at the level crossing. The gates open and close properly.

19. This public motor road is lined on both sides at wide intervals with rain-trees which are rather scraggy and do not obstruct the view of the line from the road.

20. Gradients on the line are negligible there being a rise and fall of 4.5 feet, on grades of 1 in 300, in both cases, just outside Thaton station, the remainder of the track being level.

21. The surrounding country within reasonable distance is open and flat with unrestricted view. Approaching from the Aungsaing side of the level crossing the hills on the opposite side (east side) of the line would form a dark back ground on a dark night but would not do so at full moon with the moon setting towards the west.

22. Approaching from Thaton the train engine came out of a curve at mile 134|17 and thus had over 1½ miles of straight track before reaching the level crossing at mile 136|6.

23. The motor bus approached from the Aungsaing direction. When near the level crossing it traversed 250 feet of straight road parallel to the railway followed by a right angle turn and then 15 feet of road at right angles to the line rising at 1 in 50 to the gateway which is in line with the fencing.

24. The level crossing gate had one gate-woman ; the gate hut is just outside the fencing on the east side of the railway and on the left of the road as seen from this motor bus.

25. The gate woman spent the hours from 10 p.m. to 4 a.m., nightly at her husband's quarter in the gang hut at mile 135|20-21 and did not lock the gates for fear of being fined if the padlocks were stolen.

26. The night was bright moonlight. The bus had the usual driving lights and a bulb inside for passengers.

27. There were several buses travelling in the same direction as this one taking passengers for worship at dawn at a pagoda in Thaton this being one of the nights of the Taboung festival.

28. There were altogether 17 to 22 persons riding on the bus besides the driver.

29. The gates should have been closed and locked across the road under General Rule 352 (2), (3) and (4) as there was no special man on night duty.

No lights were required on the gates under Subsidiary Rule 352 (*b*) but under General Rule 352 (1) the gateman should have been prepared to show a danger signal to any approaching train whenever the gates were opened.

30. The motor traffic over this level crossing during the day is considerable but slackens off at night except during the time of the festivals. It is seldom that more than one goods train is run at night and frequently not more than 3 or 4 in one week. There is no passenger or mixed train during the night between the hours of 20.30 and 5.30. There are however ballast and stone trains which may be as many as three a week running to open timings.

Conclusions, etc.

31. The gate keeper stated that she had received permission from a Permanent Way Inspector, about four years ago, to leave the level crossing nightly at 10 p.m., after closing the gates with locks, and to return to duty at 4 a.m. the following morning ; and that on two or three occasions the chain was broken and the lock and chain thrown away ; and that on informing the Permanent Way Inspector of this he threatened to fine her if the locks were lost again. There is no evidence to corroborate this at the same time it is highly probable.

The evidence of the Guard and driver shows that the gates were wide open and I therefore conclude that she left the gates in this condition.

The gate keeper admits that she left the gates unattended and unlocked. She thus breached General Rule 352 (1), (2), (3) and (4) and is therefore primarily responsible for the accident.

32. The driver and fireman admit that they did not see this motor bus approaching although the driving lights should have been clearly visible from the foot plate. Even if they had seen these lights on the road they had every right to assume that the gates would be closed against the road unless danger signals were exhibited under General Rule 352 (1). Moreover the driver states that he was occupied in looking out for the signals of Aungsaing station, which he was approaching, and furthermore the bus did not come from the fireman's side of the engine.

I conclude therefore that the driver and fireman were not in any way responsible for the accident.

33. This is an Engineering gate. The Permanent Way Inspector and the Assistant Permanent Way Inspector, who have been in charge of this length since 22nd July 1928 and 21st August 1928 respectively, both state that they have never made a night inspection. I do not consider this is any excuse for their not knowing the state of affairs and that General Rules were being breached. They should therefore be suitably dealt with by the Railway Administration.

Moreover they have been specially warned by the Chief Engineer in his letter No. 16998|2349, dated 7th June 1928 that the penalties which are mentioned in paragraph 501 of the Burma Railways Engineering Manual will, in future be exacted on everybody concerned with level crossing gates which are left open.

This paragraph is as follows :—" 501 (*a*). Any gateman not at his gate with hand signals ready and gate locked when a train is passing is to be fined as a minimum Rs. 2 for each offence. After the third offence he is to be dismissed."

34. The driver of the motor bus on finding the gates open was entitled to assume that no train was approaching but, from the fact that his bus was actually

run into, by a slow goods train with side lights burning on the engine, it is evident that he is guilty of lack of caution in approaching the level crossing for, though he probably slowed down to take the right angle bend in the road and though his headlights may not have shown up the engine yet, had he exercised the slightest caution, he would have both heard the approach of the train and seen the engine lights and probably the whole train as the night was clear with bright moon light.

Observations and Recommendations.

35. The Permanent Way Inspector and Assistant Permanent Way Inspector state they have done no night inspections on this length during the period of the night when the irregularities at the gate lodge were taking place. I therefore recommend that orders be issued which will insure that adequate night inspections are carried out.

36. This level crossing being on an important main P. W. D. road should I consider be brought up to the standard for A class level crossings as specified by the Railway Board in specification No. 709-Tech., dated 20th May 1928 at once ; and all other similar important crossings should be dealt with similarly without waiting for the provision of funds for dealing with those of lesser importance.

37. To insure that their orders on this matter are understood and obeyed the Chief Engineer and Traffic Manager should obtain certificates from their district officers stating the names of the persons in charge of the gates.

38. The provision of high power electric head lights on engines is undoubtedly one of the best safeguards against accidents at night, on level crossings. I therefore recommend that the fitting of these head lights to all train engines which have not already been so fitted be completed at once.

39. There have been numbers of cases of gatemen assaulted and in a few cases even murdered. In fact in connection with the very stringent orders now issued, about manning gates at level crossings, the following telegram was received on 11th March 1929 by the District Engineer, Lower District, Rangoon :—

> " Gateman Ayankia at mile 161|16 was assaulted by villagers and received a gaping wound on head for refusing to open gate during train time man treated at Thaton Civil Hospital."

The pay of gate keepers is so low that only those incapable of demanding better pay are found willing to take up this work. The gate in question was found to be in charge of a woman who could not be reasonably expected to spend the night alone in this isolated situation knowing that she was liable to be molested.

Furthermore motor traffic is rapidly increasing, so that while the duties to be performed were steadily becoming more arduous nothing had up to the time of this accident been done to relieve her of the increasing responsibility.

40. The lack of knowledge of First Aid amongst the railway employees is shown by the evidence in this case, and the necessity for it by the remarks of the Assistant Surgeon Thaton who stated in the case of the deceased woman that had any one applied First Aid within ten minutes of the accident there would have been chances of her recovery.

Energetic measures should therefore be taken to encourage the staff to qualify in First Aid.

EAST INDIAN RAILWAY.

ACCIDENT TO A DOWN BALLAST TRAIN AT DANEA BETWEEN CHANDRAPURA AND BARKAKANA ON THE GOMOH-BARKAKANA SECTION OF THE EAST INDIAN RAILWAY ON THE 6TH MARCH 1929.

FROM COLONEL C. J. CLARKE, D.S.O., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, No. 390|XIII|29, DATED THE 23RD MARCH 1929.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report of the enquiry held into the circumstances attending an accident to a ballast train near Danea on the Gomoh-Barkakana Section of the East Indian Railway.

2. I held the enquiry at Danea on the 11th March 1929 when the following were present :—

Mr. S. C. Mukherjee, Magistrate 1st Class, Hazaribagh.
Mr. L. E. Vining, Sub-Divisional Superintendent, Dhanbad.
Mr. M. Dowd, Superintendent Power, Asansol.
Mr. W. H. Strange, Superintendent Rolling Stock, Asansol.
Mr. A. R. Finlayson, Superintendent Works, Grand Chord.
Mr. S. S. Lal, Inspector, Government Railway Police, Gaya.

Description of the Accident.

3. On March 6th, 1929 a Down ballast train, non-vacuum, left Chainpur, mile 236, at 15.55 and at 16.15 ran into the catch siding above Danea, mile 228, out of control. The engine burst through the buffer at the end of the siding and came to rest in the soft earth about 90 feet beyond. The leading brake and the next 6 vehicles were piled up behind it. The other vehicles remained on the rails and were withdrawn on their own wheels. The engine was little damaged ; it was re-railed and removed on its own wheels. Besides the train staff there were about 150 coolies on the train. The 2nd Fireman, 2 ballast train coolies, one child, and one keyman were killed, the Assistant Permanent Way Inspector and 6 coolies were seriously injured, and 35 coolies very slightly injured. The relief train left Gomoh at 17.40 with medical assistance and arrived Danea at 19.30 and the 30 ton crane with Officers and District Medical Officer left Dhanbad at 19.0 and arrived at 22-10.

Description of the locality of the accident, etc.

4. Chainpur is at a summit and there is a grade of 1|100 practically continuous for 8 miles to Danea. The line is fairly straight for 3 miles, there are several curves in the next two, and then the line is fairly straight to Danea. The Bokaro Bridge is crossed half a mile from Danea. There is one loop at Danea, and a catch siding takes off to the right just outside the loop facing points and 600 yards inside the Outer signal to protect the station from possible breakaways on the grade. This siding is about 400 feet long and rises at about 1|40 with a buffer at the end and a bank of earth beyond. Both the Main and Loop lines at Danea were occupied by Pilot engines with wagons at the time of the accident, and the catch siding therefore prevented a much more serious accident.

5. (*i*) The marshalling and brakes on the train were as follows :—

	Weight. tons.	Brake.	Weight brake. tons.
(*a*) 1 C A Engine ..	42	Steam brake	42
(*b*) 1 Tender	28	Hand screw	28
(*c*) 1 brake van ..	8	Brake screw	8
(*d*) 3 Covered Goods ..	24	Hand lever brake ..	6
(*e*) 28 ballast trucks ..	420	Hand lever brake ..	105
(*f*) 1 bogie ballast truck	40	Hand screw brake ..	40
(*g*) 1 covered goods ..	8	Hand lever brake ..	2
(*h*) 1 brake van ..	8	Hand screw brake ..	8
Total ..	578	Total ..	239

(*ii*) The 32 vehicles, (*d*), (*e*) and (*g*) above, have hand lever brakes with a brake block on one wheel only. They are in good condition but this brake is meant for controlling a single wagon when shunting and is of no use on a running train. The brake block is applied by pressing down the lever and slipping it into the teeth of a rachet fixed to the frame of the vehicle. There is no means of pinning the lever in this position and as the teeth of the rachet are very shallow the least vibration causes the lever to jump out. The bogie ballast truck (*f*) has a very good screw brake worked by a wheel from one side and has double blocks on all 8 wheels.

(*iii*) The only effective brakes which could be applied with the train in motion are (*a*), (*b*), (*c*) and (*h*), *i.e.*, on 86 tons of the total of 578 tons. If (*f*) was properly screwed down it would provide another 40 tons of braked weight making 126 tons of the total of 578.

The Evidence.

6. It appears from the evidence and may be accepted as correct that—

(*a*) the brakes on the engine, tender and brakevans were in good order. They were tested before starting and had been examined the evening before by the Train Examiner at Barkakana ;

(*b*) the Guard put down the hand lever brakes on the wagons at Chainpur, the top of the incline, and the Driver knew that he had done so ;

(*c*) there was some intention of stopping for work on the incline but there were no definite orders. The Driver had a through line clear, not a working line clear, and did not intend to stop ;

(*d*) the train had attained a high speed after going two miles from Chainpur ;

(*e*) the Driver and Guard knew the road but this was the first trip down the grade with a loaded train.

7. (*a*) The Driver said that he put on his brakes as soon as he reached the top of the gradient just outside Chainpur, and the Guard, although he did not mention it in his first evidence, said that he screwed down the brake on the bogie ballast wagon. Neither of these statements can be accepted as the train would not have got out of control if either were correct. The bogie wagon brake would not be necessary if the hand lever brakes on the other wagons were efficient.

(*b*) The Driver also said that whereas rules laid down a load of 25 he was carrying 36, but these rules only apply to fully loaded goods wagons of a heavier type than the ballast wagons. The load was not excessive.

Conclusions.

8. I think that the train left Chainpur with hand lever brakes on, but not pinned down as there are no pins. These jumped off with the motion of the train ran for two or three miles with no brakes at all and had attained a high speed, 40 miles or more, before anyone realised that it was out of control. It is possible that the Driver did not realise it till he saw the Danea Outer signal at danger and tried to control the train in order to stop at it. With only the brakes on two light brake vans and the engine and tender readily applicable the train could be only partially controlled before it collided with the buffer at about 20 miles an hour. From the damage done and the statements of persons in different parts of the train the speed could not have been greater than 20 miles. The engine crew stuck to their posts to the last minute as usual for which they deserve credit.

Finding.

9. The accident was due to the hand lever brakes on the wagons jumping off and the failure of the Driver and Guard to notice this in time and apply the screw brakes.

Recommendations.

10. (*a*) Considering the number of persons employed on a ballast train, upwards of 150 in this case, braking should receive careful consideration with due regard to the grades on the section on which it has to work.

(*b*) Enough brakevans manned by brakesmen should be provided to hold the train, if there were a parting immediately behind the tender, on the steepest ascending grade without help from hand brakes on the wagons.

(*c*) An addition should be made to the Engineering Manual laying down duties of Guard, Driver and brakesmen, and rules to ensure co-operation in controlling the train.

BURMA RAILWAYS.

DESTRUCTION BY FIRE OF A BOGIE THIRD CLASS CARRIAGE ON NO. 1 UP RANGOON MANDALAY EXPRESS ON THE 10TH MARCH 1929.

FROM MR. R. R. BYRON, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A, BURMA, RANGOON, TO THE SECRETARY, RAILWAY BOARD, SIMLA, DATED THE 14TH MAY 1929.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the enquiry into the circumstances attending a fire which occurred in 1 Up Express on 10th March 1929.

2. The following attended the enquiry which was held at Rangoon on 15th March 1929 :—

Mr. H. M. Franks, District Traffic Superintendent, Lower, Rangoon.

Mr. J. H. Rickie, District Engineer, Rangoon.

Mr. E. V. M. Powell, District Locomotive Superintendent, Rangoon.

Mr. E. L. Manley, Government Inspector of Railways, Burma.

Mr. T. Lister, Deputy Commissioner, Insein.

Maung Po Tin, Inspector of Railway Police, Rangoon.

Description of the accident.

3. At about 13½ hours on 10th March 1929 whilst No. 1 Up Express was proceeding from Thingangyum to Togyaunggale between miles 5 and 6 a third class bogie coach No. B. T. C. 6265 the second from the engine was found to be on fire. The train was promptly stopped and the burning vehicle was isolated from the rest of the train. As a result of the accident the body work to the coach was completely destroyed and seventy passengers received injuries five being serious.

The injuries were all received through the passengers jumping from the moving train.

The relief train arrived early on the scene within 1½ hours of the accident when the injured passengers were attended to. Prior to the arrival of the relief train the evidence does not state what aid if any was given to the injured passengers by the train staff. Mention is made of a lady passenger rendering first aid.

All the endeavours of the train staff appear to have been concentrated on extinguishing the fire which appears to have been hopeless from the beginning. Having separated the burning coach from the rest of the train it might have been left and every endeavour made to relieve the injured.

Conclusions, etc.

The finding arrived at by the members of the Officers Joint Enquiry, *viz.* :—

> " That the accident was not caused by a hot axle box or any defect in the rolling stock nor could it have been caused from sparks from the engine. The suddenness with which the fire originated, the rapidity with which it spread, and its location, point to a source within the carriage and indicate that the fire was caused by the (accidental) ignition of highly inflammable liquid which had been split on the floor of the carriage."

is I think correct and there is nothing to add to it.

Recommendations.

In view of the above finding it is difficult to make any useful recommendation. The remedy lies in educating the travelling public to the great danger incurred in taking unprotected inflammable articles into a train.

In the present case a short description of the accident and the result might be printed in English and the vernacular and posted up in carriages and at stations and elsewhere.

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BENGAL AND NORTH WESTERN RAILWAY.

ACCIDENT TO 40 DOWN PASSENGER TRAIN NEAR SAMASTIPUR ON 26TH MAY 1929.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 246-T., DATED THE 25TH JUNE 1929.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I beg to submit a report on an accident to No. 40, Down Bengal and North-Western Railway passenger train near Samastipur on 26th May 1929.

2. I had proposed to hold an enquiry on 8th June 1929, but the Agent suggested that a District Officers' enquiry was being held on 1st June 1929 and the Traffic Manager had made a personal enquiry and submitted a report and as the facts seemed clear that no further special enquiry should be held.

3. This proposal was accepted by me and the evidence and Traffic Manager's report was discussed with the Administration at a meeting at Muzaffarpur on 7th June 1929.

Description of the Accident.

4. On the 26th May at about 15 hours, 10 Down and 40 Down passenger trains were approaching Samastipur station at about the same time. It was decided to receive 10 Down first and stop 40 Down at its outer signal.

5. At about 15.5 a cyclonic storm, direction about W. S. W. with wind velocity estimated at 80 to 100 miles an hour struck Samastipur but only for a width of about a mile and a half. 10 Down passenger ran through it into the station, though passengers have testified to the violence of the wind and that the carriages swayed and rocked dangerously, but 40 Down as it came to a stand at its Outer signal was more seriously affected. One Intermediate Class six-wheeler carriage 2nd from the engine was blown clean over down the bank with its top crushed-in and wheels in the air. The six-wheeled Brakevan next to the engine, and one six-wheeled Composite Intermediate and III—3rd from the engine were blown or dragged over on to their sides down the bank. The Engine tender and leading wheels of 4th vehicle a Composite 1st and 2nd class six-wheeler were derailed.

Description of the site of the Accident.

6. The accident occurred just outside the Down Outer signal from Darbhanga. The line is on a curve of 1,500 feet radius on a 10 ft. bank with flat open country on both sides. A superelevation of 2 $\frac{1}{8}$ inches is given on the curve for a speed of 35 miles per hour.

Precis of the Evidence.

7. The evidence of the train staff, the Station staff of Samastipur, the passengers of 10 Down and 40 Down and of people living in the vicinity is unanimous in testifying to the violence of the wind, the rocking of the coaches of both trains and finally that the accident was due directly to the storm.

Conclusions.

8. In my opinion there can be no doubt that the storm of great violence blew over and down the bank the Intermediate carriage of the train which was 2nd from the engine. This carriage with the help of the wind pulled over on to their sides the 1st and 3rd carriages and they in their turn pulled off and derailed the tender of the engine and the leading wheels of the 4th carriage.

9. It is possible that, if the train had not compulsory to come to a stand on the curve, the accident may not have occurred. The superelevation gave the carriage a tilt away from the direction of the wind so that the advantage was lost that a centrifugal force, induced by a higher speed of the train, would have provided to counteract the wind pressure.

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10. In areas subject to violent storms it would I think be advisable for Railway Administrations to instruct drivers that if they consider it necessary to pull up on account of the storm they should avoid pulling up on curves or bridges if possible.

Damage done and arrangements made for treatment and evacuation of injured.

11. Damage was done to Rolling-Stock to the extent of about Rs. 3,000 and to Permanent-way to an insignificant amount.

12. As soon as the Station Master heard of the accident he took the Shunting engine and 3 carriages to the site of the accident and at about 16 hours he sent out the Breakdown and Relief trains from Samastipur. The line was cleared and restored by 23.30 hours.

13. As a result of the accident there were 9 persons injured of whom 3 were more or less seriously injured.

14. Medical help was rendered very promptly by Dr. Ghose's hospital just near the site of the accident and the Railway Medical Officer, Samastipur, Dr. Birney. Messrs. Vernon and Main, Engineers of the Samastipur Sugar Factory, bore evidence of the help rendered and good work done by the Guard of the train.

I consider that everything possible was done promptly by all the Railway staff concerned.

ASSAM BENGAL RAILWAY.

DERAILMENT OF AN ENGINEERING RELIEF TRAIN AT MILE 340¾ BETWEEN MUPA AND LANGTING STATIONS ON 11TH JUNE 1929.

FROM MR. E. L. MANLEY, M. INST., C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, DATED THE 29TH JUNE 1929.

In accordance with Rule (7) of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I submit herewith a report of the inquiry, held by me, into the circumstances attending the derailment of an Up Engineering Relief Train at mile 340¾ between Mupa and Langting stations on the Hill Section of the Assam Bengal Railway on 11th June 1929.

2. The following attended the enquiry which was held at Langting station on 16th and 18th June 1929.

Mr. W. H. Calvert, Sub-Divisional Officer, North Cachar Hills, Haflong, Assam.

Mr. B. H. Routledge, Superintendent of Railway Police, Haflong Hill.

Dr. F. C. Lees, Medical Officer, A. B. Railway, Lumding.

Mr. A. Morant, Acting District Engineer, A. B. R. Lumding.

Mr. W. C. Blake, District Traffic Superintendent, Lumding.

Mr. P. Smithson, Acting District Locomotive Superintendent, Lumding.

The statement of Tunnel Inspector Mr. S. A. Khan, who was travelling in the cab of the wrecked engine until very shortly before the accident, was recorded by Mr. W. H. Calvert, Sub-Divisional Officer, North Cachar Hills on 22nd June 1929 as this witness could not attend the inquiry on account of his ankle being sprained.

Description of the accident.

3. On 11th June 1929 at 3.10 hrs. while Up Relief Special was proceeding from Mupa (mile 332¾) to Langting (mile 343) the track, at mile 340¾, subsided under the engine of this train owing to the bank, which is about 20 feet high, having been affected by flood water, empounded by it, on the East side of the line.

4. The engine sank vertically but owing to the gap in the bank being only just the length of the engine the tender was tilted up at an angle of about 60 degrees to the horizontal and telescoped into the engine cab.

5. The engine driver, both firemen, the District Engineer, Haflong, the Assistant Engineer and the gang mate of the length, all of whom were riding on the foot-plate inside the engine cab, were killed having been crushed against the end of the boiler, partly buried in coal from the tender and enveloped in the rush of steam which escaped from the broken steam connections in the cab. Death must have been instantaneous in all cases.

6. The total damage is estimated to amount to approximately Rs. 8,000 in the case of locomotive and rolling stock, and to Rs. 2,500 in the case of the bank and permanent-way.

Every effort was made to get a relief special through to the scene of the accident but owing to there being heavy slips in the cuttings it was impossible to get the train up to the Langting River, which is between Langting station and the site of the accident, before the bridge was too unsafe to be used.

Owing to heavy slips it was equally impossible to get a relief train through from the south side.

Description of the locality of the accident.

7. The line passes through thick forest. Undergrowth reaches right up to the toe of the bank on the West side.

The line is straight from mile 340 to mile 340.9. It rises on a grade of 1 in 202 from mile 340.06 to mile 340.1, it is then level to mile 340.5 and then falls

on a grade of 1 in 250 to mile 340.6. From there it falls at 1 in 70 to mile 340.7 and then at 1 in 233 to just beyond the site of the accident, after which it is level for some distance.

8. At the site of this subsidence the bank is about 20 feet high and it had empounded water on the East side of the line forming a small lake between the bank and the neighbouring high ground. The engine, an Assam Bengal Railway K Class, 4-8-0 type, was fitted with an electric search light of 300 candle power, and was travelling chimney leading.

There is no bridge or culvert near the site of the accident and there never has been one.

Conclusion.

9. There had been continuous heavy rain throughout the night of 9th June and further rain during the day and night of 10th June.

The Assistant Permanent-Way Inspector had worked a ballast train on 10th June between mile 345 and mile 326½ attending to numerous slips, clearing them with the aid of the train. He found the slips so heavy at mile 334¾ that he sent the train back from there to Langting (mile 343) the train leaving mile 334¾ at noon. This Assistant Permanent-Way Inspector had passed the site of the accident at about 8 hrs. on 10th morning when taking out this ballast train.

In the evening of 10th June the ballast train having already been sent back, he returned to Langting by trolly and passed the site of the accident again about 18 or 19 hrs. but saw nothing wrong there on either occasion.

He had however blocked the section between Langting and Mupa at 13 hours on 10th June owing to numerous slips and heavy rain and had advised all concerned including the District Engineer (Mr. Zemin) and the Assistant Engineer (Mr. Gaston).

In the Railway Rules it is laid down that this length has to be petrolled nightly by two men who work together under the orders of the Assistant Permanent-Way Inspector. They are due to leave Mupa at 0-15 A.M. daily and arrive at Langting at 5 A.M.

On the 10th June one of these men had had to obtain food at Langting so started his patrol from there at 21 hours. He noticed that the Langting Bridge was unsafe. He reported to the District Engineer (Mr. Zemin) whom he met near mile 335, on the engine of his Relief Train, concerning the Langting Bridge and certain slips.

The Tunnel Inspector in his statement says the patrolman informed Mr. Zemin that the line had sunk about 2 feet near mile 340. I am not inclined to believe the Tunnel Inspector's statement on this point as the patrolman Hustabir, who was particularly questioned on this point at the inquiry stated "I saw nothing wrong with the line except at the Langting Bridge....." and this statement was also supported by patrolman Durba Lal ; furthermore the Tunnel Inspector also stated—"There was no water running through the breach immediately after the accident" which is absurd.

In order to try and restore rail communication, as soon as possible, over the blocked section, the District Engineer formed a relief ballast train and proceeded up the line with it, clearing slips as he came to them. The engine was fitted with a search-light and was proceeding at a slow speed in view of the need for great caution. It left Mupa (mile 332¾) at 23|55 hours on 10th June and the accident occurred at mile 340¾ at 3|10 hours on 11th June but three slips had had to be cleared between those two places. This had taken about 2 hours and 20 minutes.

There are three ways in which this accident might have occurred.

A. The bank might have been washed out leaving the track suspended. I discard this possibility as the people on the engine cab would have easily detected this from the light of the engine search-light and the train being fully vacuum braked could easily have been pulled up in time.

B. A cavity might have been hollowed out through the bank by the percolation of water which was impounded by it on the East side. This theory I also discard as a sufficiently large cavity, to allow the engine to subside the distance which it did, could not be formed without the bank collapsing and leaving the track suspended.

The driver of the last train over the site prior to the wrecked train states in his evidence that water was percolating through the bank when he passed. This witness was, however, an obviously very unreliable type of man and his statement that a little water was trickling through is absurd for the undergrowth on the West side of the line would prevent this being detected. I therefore disbelieve his evidence on this point entirely.

C. I find therefore that the cause of this accident was the subsidence of the bank under the weight of the engine owing to the earth of which the bank is composed being to a great extent saturated with water which had soaked into it from the heavy rain and from the water empounded by the bank on the East side. As soon as this subsidence took place the water from the small lake on the East side was able to flow over the top of the gap and wash the earth away down to ground level. This accounts for the track sleepers having been carried some distance into the jungle where they were embedded in and mixed up with soil washed out of the subsidence. This also accounts for the engine being left suspended by its two ends and for the length of the gap in the bank exactly fitting the length of the engine.

I therefore do not hold anyone responsible for this accident.

With regard to precautions for preventing such an accident occurring again, the Assam Bengal Railway Administration already have rules for adequately protecting the running of public traffic trains over the Hill Section and with regard to Engineering trains the matter is left to the discretion of the Engineer-in-charge.

In view, however, of the treacherous nature of the soil of which this section of the line is built I consider that all Engineers, when posted to the charge of this section, should be specially warned of the great danger in running trains immediately after periods of exceptionally long and heavy rainfall.

At mile 340¾, the site of the accident, a culvert is to be built to avoid water being ponded up here in future.

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NORTH-WESTERN RAILWAY.

COLLISION BETWEEN 41 UP PASSENGER TRAIN AND MOTOR BUS NO. P.-3367-A. AT MILE 36|12 NEAR DHARIWAL ON AMRITSAR-PATHANKOT BRANCH ON 20TH JUNE 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 79|29-959, DATED THE 15TH JULY 1929.

In accordance with Rule (7) of Railway Board's No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the collision between 41 up passenger train and Motor Bus No. P.-3367-A. at level crossing mile 36|12 near Dhariwal on the Amritsar Pathankot Branch of the North Western Railway on 20th June 1929.

2. An officers' joint enquiry was held at Dhariwal on 21st June 1929 of which no intimation was given me, the proceedings of this enquiry were received by me on 23rd June 1929 and as they were in my opinion so perfunctory and one sided I decided to hold an enquiry on 27th June 1929.

3. I arrived at Dhariwal on 27th June 1929 and held the enquiry in the presence of Mr. H. D. Furley, Divisional Superintendent, Mr. A. Cornish, Divisional Rolling Stock Officer, Mr. E. A. Rokeby, Divisional Transportation Officer, Mr. P. C. Taela, Divisional Engineer, Diwan Sukha Nand, Sub-Magistrate, Gurdaspur District, and Mr. A. L. F. Evans, Assistant Inspector General, Railway Police ; on 29th June 1929. I made further enquiries into the medical arrangements as the doctor concerned was away from Dhariwal on the 27th June. The evidence taken at the joint enquiry was accepted and further questions put to the witnesses concerned in regard to points not previously touched on.

4. *Description of the accident.*—On 20th June 1929, 41 Up passenger train was approaching the up outer signal of Dhariwal station and collided with motor Bus No. P.-3367-A. at 16|33 hours at an unmanned level crossing at mile 36|12 of the Amritsar Pathankot Branch of the North Western Railway on the right bank of the Upper Bari Doab Canal.

5. The front wheels of the Bus had passed over one running rail of the track when the engine stalled, and before the Bus driver could re-start the engine and proceed forward or backwards the fore part of the Bus was struck by the engine of the train. The Bus was very badly damaged and was hurled against the end post of the down stream girder of the canal bridge, whence it was deflected against the west parapet of the right abutment return wall which was considerably damaged by the impact. The Bus being stopped by the parapet wall was turned sideways jammed between it and the train and removed with some difficulty about an hour later.

6. The train proceeded for about 230 feet before it was stopped, no damage being done either to it or the track, none of the railway staff or passengers sustained injuries. The train consisted of engine No. 2413-S.G.|S., nine bogie coaches and a four wheeled brake, total load about 460 tons.

7. Of the 22 passengers in the Bus four were killed outright, one was hurled into the canal and is missing, nine were seriously injured of whom one, the driver, has since died and one is in a precarious condition, the others are expected to recover.

Two of the persons killed were found under the train, one under the engine and one under the front bogie brake van, one injured person was lying on the bottom boam of the girder and the others dead and injured alongside the track mixed up with the debris of the Bus. Of the uninjured persons two jumped off the Bus before the collision as they saw the train approaching, the remainder were hurled out of the Bus and temporarily stunned. The brakes on engine and train and the motor Bus were said to be in good order. The train was running at a speed of about 10—12 miles an hour when the collision occurred, and the up outer signal of Dhariwal was " off " for its reception. The train message books at Sohal and Dhariwal show the train left Sohal a 16|29 and according to the guard the accident occurred 4 minutes later ; the guard's timing of the departure of the train was 8 minutes out.

8. *Description of the locality of the accident.*—Approaching Dhariwal from Sohal the track is straight upto mile 36|18 whence it swings to the left through a curve of 2,500 feet radius upto mile 36|12-13 and on an embankment 6 to 8 feet high. At mile 36|12 a kucha road (site of accident) crosses the track at a skew of about 60°, between mile 36|11 and 12 the upper Bari Doab Canal is crossed by a through warren girder 150 feet span ; at mile 36|11 another kucha road, the Canal inspection road, is crossed with gates some 150 feet from the railway and the usual conventional road signs further back. These two kucha roads are on the canal banks and parallel to it.

9. The track continues straight from mile 36|12-13 to mile 36|11 and then swings to the right through a curve of 2,500 feet radius upto mile 36|3-4 whence it continues straight up to the station ; the up outer signal of Dhariwal is at mile 36|8-9.

From mile 36|20 the track is level to mile 36|15, rising from mile 36|15 at 1 in 400 upto mile 36|12, level from mile 36|12 to 36|11 across the level crossings and the bridge, falling at 1 in 700 from mile 36|11 to mile 36|9-10 and continuing level to the station.

10. From an actual test on the footplate of an engine the following observations were made relative to the road and crossing where the accident occurred.

(*a*) From the left of the engine the outer signal is visible from 1,860 feet and the level crossing from 1,310 ft. ; from the latter point one can see some 190 ft. along the kucha road west of the track with the view occasionally obscured by the foliage and trunks of three large trees.

(*b*) From the right of the engine the outer signal is visible from 1,100 ft. and the level crossing from 440 ft. ; from the latter point one can see some 190 ft. along the kucha road west of the track with the view occasionally obscured by the foliage and trunks of the same trees.

The view on the railway from the points cited above is clear upto the signal and level crossing throughout ; the three trees referred to are on the edge of the road one some 50 ft. from the track and the other two 110 ft. away.

11. The road at mile 36|12 (site of collision) runs along the right bank of the Upper Bari Doab Canal and is open to public use, though rarely used by motors as it has a kucha surface badly rutted by cart traffic.

It is more or less level until within 100 ft. of the track when it rises at 1 in 148 for 65 ft. and at 1 in 11.3 for 30 ft., it is then level for 10 ft. across the track, falls at 1 in 14.3 for 35 ft. and at 1 in 103 for 60 ft. and continues level onwards. The road surface at the level crossings was in a disgraceful condition ; on the outside of the running rails it was three inches lower and between the guard rails one inch lower than the top table of the track rails. The road surface at the level crossing is some three feet above the general level of road and unmetalled ; the approaches are kucha and fairly even.

12. Approaching the railway by road the view of the former, on the left, is obscured by a continuous line of trees until within 190 ft. of it, for the next 80 ft. there are no trees on the road but two trees at mile 36|13 partially obscure the view ; in the next 15 ft. two trees along the road come in the way and there is then 95 ft. clear except for one tree ; along the road the trunks of the trees, only come in the way, the foliage is above the line of vision. On the right of the road an uninterrupted view of the railway across the canal, is obtained for several hundred feet and the up outer signal of Dhariwal stands out boldly against a background of trees.

Except for the five trees cited above it is possible to get a fairly good view of the railway from the road right up to mile 37|20, a distance of about 1,700 ft.

13. The collision occurred in broad daylight when it was fine and clear. The plan attached shows the relative position of road and rail with the grades, curves, trees, etc., which relate to the accident. There are no warning signal or notices on the kucha road to indicate to road users that they are approaching a line of railway nor is there any warning on the railway to advise engine drivers they are approaching a level crossing ; this is the general state of affairs at unmanned level crossings on the North Western Railway.

14. *Conclusion.*—The evidence as is usual in such cases is conflicting and the witnesses have ranged themselves into two camps-road versus rail ; from the demeanour of the witnesses, their evidence and the relevant facts at the site of the accident it is possible to summarise the position and form reasonable conclusions.

15. The evidence of Rattan Singh, Mustaq Ahmed, Mohammad Nasir and Kazan Singh shows the Bus driver was proceeding at a slow speed owing to the state of the road and there is no reason why this should be doubted ; seeing an unmanned level crossing ahead the Bus driver took it for granted he could cross the railway with impunity ; some horsemen of the marriage party on the Bus were ahead and he was misled by their having crossed in safety. It is obvious from the evidence of the persons cited above who were on the Bus that no one was keeping a look out for trains and the first intimation they got of one was when it was 300 or 400 ft. away. The Bus driver had a clear view on the right of the outer signal which was " Off " ; on his left he had two passengers and a child with him on the driving seat who undoubtedly came in his way.

16. The driver of the train appears to have sounded his whistle when he was some 1,200 ft. away but no one on the Bus heard it ; they were probably in a merely humour heedless of their surroundings and depending entirely on the Bus driver.

17. One of the ordinary canons and conventions of road traffic to-day is the exercise of every reasonable precaution by a motorist when approaching a main stream of traffic from a side turning ; railway level crossings, particularly unmanned ones, should in the interests of the travelling public be treated with not less respect. The Bus driver failed to realise his obligations both as regards road and rail and committed a rash and negligent act, in attempting to cross the track, and has paid the penalty with his life. It must be admitted in his favour he appears to have had a very good chance of getting across if it had not been for the bad condition of the road surface at the crossing with rails standing out three inches. The bump he got in surmounting the rail stalled his engine and as he had no electric starter he had no time to get out and use the starter handle ; had he speeded up to cross the track the surmounting of the exposed rail might have burst his tyres with serious results as he had three passengers in excess of his schedule complement. The owner of the Bus Mushtaq Ahmed was riding on the front seat beside the driver and deserves to be severely punished for not asserting his authority in forbidding the Bus driver to cross the track, for not keeping a look out on the left considering that he obscured the driver's view and for allowing an excess number of passengers to be on the Bus.

18. The condition of the level crossing calls for special comment its condition was noted by the Executive Engineer Mr. Taela on the morning following the accident and I accept his evidence. From the quarterly report submitted by the P. W. I. it appears orders were issued by the Sub-Divisional Officer in July 1928 to make the gang mates maintain the level crossing in good order. The P. W. I. Abdul Majid states he conveyed the orders to his S. W. I. Diwan Chand and to the gangmates and according to them repairs were done. In subsequent reports upto 31st March 1929 the P. W. I. certified that level crossings were in good order and has put forward the plea that this one had been damaged by rain on 12th and 13th June 1929 when some two inches of rain fell at Dhariwal. I cannot accept this, as a consolidated kucha road surface does not get damaged by such rain to the extent of washing off three inches of its surface. The P. W. I. states in his defence he has an 80 mile length including 12 miles of a new unballasted branch and that prior to the accident he was engaged for some time in dismantling the ballast sidings at Chakki (Pathankot) ; the S. W. I. also lays the blame on the rain and states he had all road surfaces repaired. The Sub-Divisional Officer Mr. Batra trollied over the level crossing on 13th June 1929 and made no comment on the condition of it. It is for the railway administration to investigate matters and apportion the blame for the great laxity displayed by the engineering branch in doing their work.

19. The North Western Railway type design for a 4th class level crossing shows there must be 40 ft. level at the top with graded approaches of 1 in 15 and metalling to the railway boundary on either side ; none of these conditions existed at this crossing.

I am of opinion the condition of the level crossing was a contributary factor to the cause of the accident and the railway administration must accept blame for it.

20. I was not impressed with the demeanour of Driver Fazal Din and Fireman Ram Kishan as witnesses they were a sullen pair determined not to impart any information beyond their original bold statements and replying to my questions as briefly as possible for fear of incriminating themselves. These two men as well as Commercial Supervisor Ganda Mall state the engine whistled for the first time close to the level crossing whereas P. W. I. Abdul Majid, Guard Sant Ram and Fireman Karm Elahi state it did so at the beginning of the curve, *i.e.*, some 1,200 ft. away.

21. Driver Fazal Din and Fireman Ram Kishan state they saw the outer signal, level crossing and lorry for the first time when about 90 ft. from the crossing, I consider they have overreached themselves in their endeavours to evade responsibility by professing ignorance of what was ahead of them, and have no hesitation in rejecting their evidence as deliberate falsehood as the tests made by me disprove their statements. They are totally unreliable witnesses especially as regards their pleas of not being able to estimate distance when they were confronted with the fact that it is possible to see the outer signal and the level crossing from 1,860, 1,100, 1,310, and 440 ft. from the left and right of the engine respectively and I consider that men of such mentality are a danger on the footplate.

22. There were several good reasons why they should have been cautious and on the alert just before the collision, *viz.* :—

(*a*) They were approaching a station.

(*b*) Signals had to be looked for.

(*c*) Two unmanned level crossings were ahead of them.

(*d*) There was a permanent restriction of 10 mile per hour over the canal bridge to be observed.

(*e*) They were rounding a curve.

(*f*) They saw the line washed mark on the track, which is 3|4 mile from the outer signal and is an indication to a driver that he is approaching a station.

23. Driver Fazal Din's asertion that the Bus driver stopped short of the track, when the train was only 30 yards away, and then deliberately attempted to cross in front of him is a canard, it is inconceivable that anyone but a madman would do such a foolish thing, moreover in this space of 10 seconds the Bus driver could scarcely have let in his gears and accelerated from a stationery position ; this statement is typical of driver Fazal Din's attitude in this case.

24. There is no direct evidence to show for how long the Bus was stationery on the track before it was run into cleaner Mohammad Nasir, a very intelligent witness, states it was under a minute and from the fact that he and Dial Singh who was on the front seat, had time to see the train and jump clear of the Bus I am of opinion that it must have been at rest for 40 or 50 seconds. If driver Fazal Din and fireman Ram Kishen had been on the alert and were running at 10 miles per hour as admitted by them they must have been at least 360 ft. away from the Bus and making allowances for Driver Fazal Din to make up his mind as to what he should do I consider he should have been able to pull up in time or have just bumped into the Bus. From the way the Bus was struck and hurled forward and from the fact that the engine travelled on for about 230 ft. it is more than evident that the vacuum brake was not applied till the engine collided with the Bus.

25. I consider Driver Fazal Din is guilty of negligent driving and both he and Fireman Ram Kishan failed to exercise even ordinary caution and as such their action was a contributory factor in causing the accident for which they should be severely punished.

Driver Fazal Din has 28 years service and passed as a driver in 1909, he has a good record and is in the special grade ; he has been running on this section on passenger trains for 3 or 4 years and is thoroughly acquainted with it, he had 12 hours rest before driving this train. He admits having stepped across to the left side to see the outer signal for himself and must also have seen the level crossing. The Divisional Superintendent and the Divisional Rolling Stock Officer are of opinion it should have been possible to pull up the train in about 250 ft.

26. Unmanned level crossings on the North Western Railway have warnings neither on road nor rail and with the advent of motor traffic which is increasing

rapidly and penetrating into remote parts of the country the question of providing safeguards has become an urgent matter. According to the Board of Trade Regulations in England such crossings are forbidden on all main lines ; on light railways, corresponding to Indian Branch Lines, the following regulations are imposed.

(*a*) Warning boards to be exhibited on the road with notices such as " Beware of trains ", " Level crossing without gates " and other appropriate wording, at least two on each approach.

(*b*) Reduction of speed of the trains to 10 mile per hour across the crossing from points 200 yards on either side of it.

(*c*) Engine whistle to be sounded continuously from the points cited above to within 100 yards of the crossing, *viz.* :—for a period of about 20 seconds.

(*d*) Combined " Whistle " and speed boards to be erected on the railway at points 200 yards from the crossing.

(*e*) The usual trespass notice to be erected at the level crossing.

27. These regulations are imposed on branches with as many as five passenger trains and one goods train each way daily and maximum speeds of 25 miles per hour ; road traffic too is usually heavier than in India. If such stringent measures do not deter the railways from building branches and have not hampered their operation it seems to me that something of a similar nature should be imposed in this country to safeguard the travelling public and road users. The classification of road crossings was done in most cases, years ago and with the advent of motor traffic a review of the position is called for. Further the question of remanning of certain road crossings which were degraded some six years ago, as a measure of economy, should be re-opened.

28. The state of the road surface at the level crossing the presence of trees and observations relating to conditions of visibility from the footplate and the road were not touched on at the joint enquiry held by Senior Scale Officers. Explicit instructions concerning enquiries are laid down in Subsidiary Rules 166|84-92 and a certificate to the effect that the rules had been read before the enquiry was signed by the President. Relevant facts having an important bearing on the case should have been brought to light even though they were unpalatable to the officers concerned. I consider they have failed in their duty and it was left to me to find out subsequently what the conditions were at the time of the collision. The administration should take serious notice of the way the joint enquiry was conducted and see that the staff holding enquiries realise their responsibilities.

29. I am of opinion Bus driver Rattan Singh is primarily to blame for the collision owing to his rash and negligent action in attempting to cross the track in the face of an approaching train.

Driver Fazal Din and fireman Ram Kishan are to blame for not being on the alert and for not attempting to slow down or stop the train earlier when they realised a collision was inminent.

P. W. I. Abdul Majid and S. W. I. Dewan Chand are to blame for not complying with the orders regarding maintenance of level crossings issued by the Sub-Divisional Officer and laid down in the Way and Works Manual paragraph 386.

30. *Recommendations.*—Warning notices and conventional road signs should be erected at all unmanned crossings used by motor traffic so long as they remain unprotected.

31. The question of introducing safeguards such as reduction of speed, whistling of engines and erection of " Whistle " and " speed " boards on the railway should be investigated with a view to introducing similar measures prescribed by the Light Railway Order in England.

32. The re-classification of unmanned crossings used by motors should be undertaken in consultation with the Local Government, and a definite policy laid down for gradually eliminating them.

33. The clearing of trees in the vicinity of level crossings, say, for 1,000 ft. along the railway and 200 ft. along the road, should be taken in hand where the view from road and rail is obscured.

34. The attention of officials conducting enquiries should be drawn to the necessity for making an impartial and thorough investigation and elucidating all points having a bearing on the case.

35. The railway staff and the police should be strictly forbidden from harassing injured persons, in great pain, by extorting statements from them ; they should only be approached when a doctor certifies they are fit to be questioned

36. The provision of first aid boxes on all passenger trains as laid down by the Railway Board in paragraph II, 7, and Appendix 4. Note (*i*) of the Annexure to their letter No. 2673-T., dated 11th October 1928 must be expedited.

37. The passing in " First Aid " by railway staff, in larger number, requires consideration. Monetary rewards do not appear to be of much use and it is a moot point whether compulsory measures should be enforced. Of eight of the staff at this collision only one was qualified.

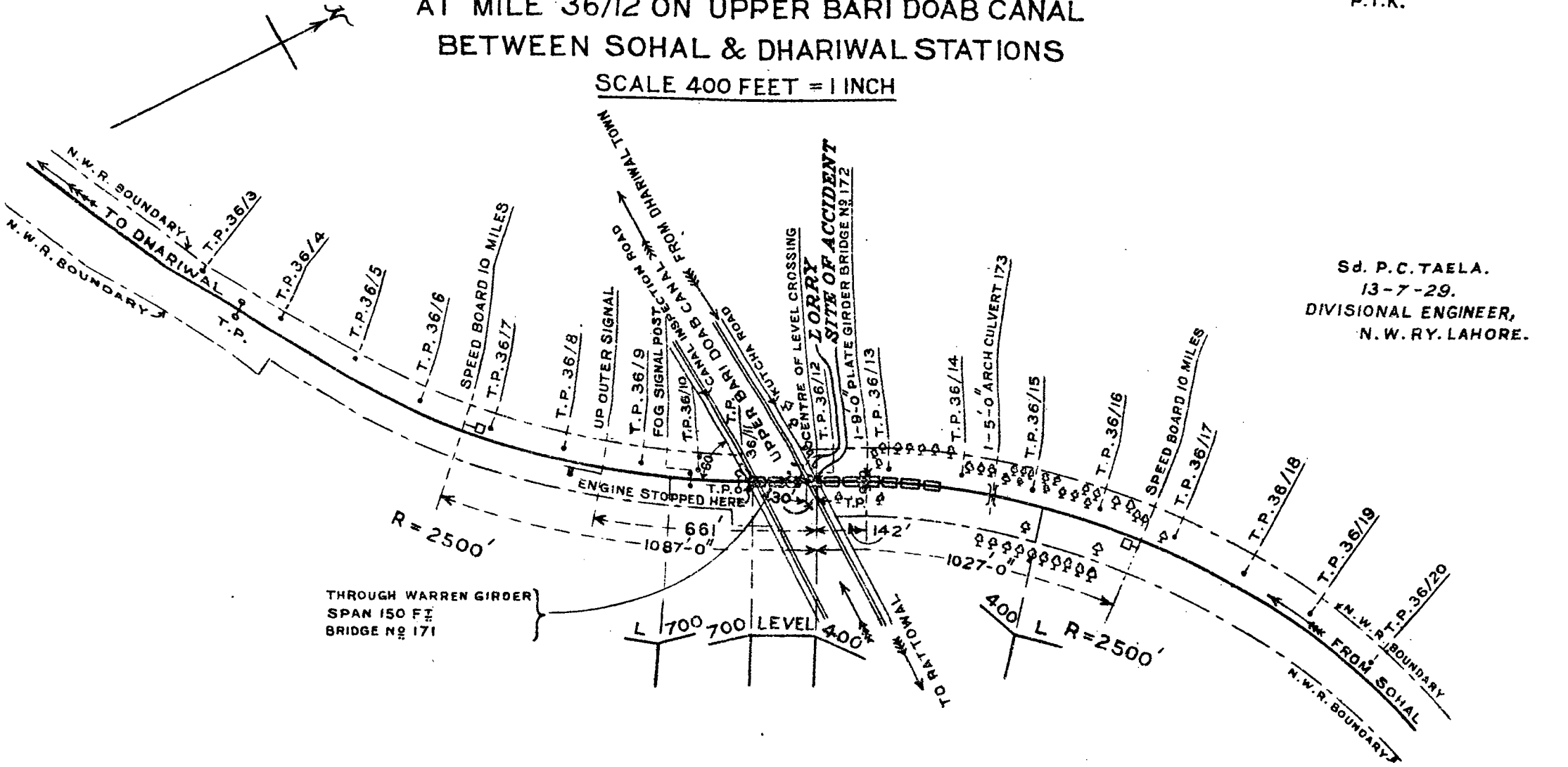
38. The provision of some preparation of morphia in First Aid boxes on passenger trains for alleviating the sufferings of injured persons might be considered, if adequate safeguards can be laid down for its administration.

N. W. R.

PLAN SHOWING SITE OF ACCIDENT ON 20-6-29 AT MILE 36/12 ON UPPER BARI DOAB CANAL BETWEEN SOHAL & DHARIWAL STATIONS

SCALE 400 FEET = 1 INCH

No 12-M.P. / A.S.R. 8-7-29 / P.T.K. L.H.R.



Sd. P.C. TAELA.
13-7-29.
DIVISIONAL ENGINEER,
N.W. RY. LAHORE.

No. 92.550

BENGAL-NAGPUR RAILWAY.

COLLISION BETWEEN A LIGHT ENGINE AND A MOTOR BUS NEAR THE NORTH LEVEL CROSSING GATE OF JAJPUR ROAD STATION AT 20 HOURS ON 4TH JULY 1929.

FROM MR. H. LAWTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1750-XIII|29, DATED THE 30TH DECEMBER 1929.

In accordance with Rules 7 and 8 of the Accident Rule promulgated with Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I forward herewith my report on the above mentioned accident.

2. The enquiry was held by me at Jajpur Road Station on 8th and 9th July 1929, all the following being present the first day but those marked with an asterisk being unable to attend the second day :—

	Rank.
Mr. H. Lawton	Senior Government Inspector No. 1.
*Mr. A. D. Banerji ..	S. D. O., Bhadrak.
Mr. C. S. Biswas, G. R. P. ..	Circle Inspector, Khurda Road, representing S. R. P., G. R. P.
Mr. K. C. Chandra ..	S. D. O., Jajpur representing the District Magistrate, Cuttack.
Mr. R. C. Curtis ...	D. C. O., Waltair.
Mr. H. F. Ellison ..	D. E., Khargpur.
*Mr. J. E. Embleton ..	A. E., Balasore.
*Mr. C. C. Haldar, G. R. P...	Prosecuting Inspector, B. N. Railway, Kharagpur.
Mr. K. W. R. O'Reilly ..	D. T. O., Khurda Road.
Mr. R. Presswell ..	D. L. O., Khurda Road.

3. The Site of the accident was visited by me with the Superintendent of Railway Police (Mr. W. C. McGrath) on 13th July 1929.

Description of the Accident.

1. At Jajpur Road Station, Bengal-Nagpur Railway East Coast Section Single Line (between Bhadrak and Cuttack) at about 20 hours on the 4th July 1929, the night at that time being cloudy and dark but not raining, an Up (*i.e.*, southward bound) Light Engine, No. 349-H.M., running engine foremost was held for a few minutes at the Up Outer Signal and then got signals for the loop line. Just in front of the up (north) facing points (at mile 209) there is a level crossing, and as the Light Engine approached this level crossing from the Outer Signal at the same time a Motor-Bus full of passengers approached it from Jajpur on the east side (*i.e.*, left side of the Light Engine). The Light Engine was not fitted with electric head light but had the usual front oil lamps alight (two red). The Motor-Bus had at least one electric head light alight.

2. Whilst the Motor-Bus was centrally over the track, *i.e.*, the track was midway between front and back wheels, the Light Engine ran into it. The cow-catcher of the Light Engine went under the Bus lifting its right side and pushed the canted Bus sideways along the track, at first on the two left wheels and then when these broke more or less skidding the Bus along the rails on the left side of the chassis but the Bus did not overturn. The occupants of the Bus started at once to shout, and the Driver of the Light Engine put his brakes hard on coming to rest with the centre of the Bus about 115 feet from the level crossing and about 20 feet before the facing points.

3. On stopping, the Driver of the Light Engine got down at once and looked round for injured persons, first in front of the Bus (in direction of pushing) when he found three or four sitting on the track with legs pinned under the Bus, then under his engine where he found no one, and then behind his engine where he found a woman lying between the rails. By this time all the occupants of the Bus had got out. He then backed his engine clear of the Bus thus more or less righting it and freeing those pinned in front. He states that he then went to

the Level crossing where he found both gates open the gatelodge locked and the gateman not present at his gates. He counted the occupants of the Bus and made the number thirty. The Assistant Station Master who was on duty, the Station Master who happened to be at the station, and two other station staff then arrived at the accident. They also verified that both the level crossing gates were open, the gate-lodge locked, and the gateman not present at the gates ; they called out to him but got no reply.

The P. W. Is. arrived by train at about 23.30 hours, and with the help of Railway staff collected there cleared the line at 0.45 hrs.

5. The Motor-Bus was a 1-ton Ford " Capacity for 16 to 18 Passengers " but apparently at the time of the accident there were twenty-nine persons in it namely 1 driver 1 cleaner 1 owner's son 26 passengers (15 female 11 male). Three passengers were sitting in the drivers compartment, with the owners son and the cleaner sitting in the right and left doorways of that compartment ; and severe injuries were confined to the occupants of that compartment.

6. No damage was done to engine or track. The motor-bus had both its left wheels smashed (spokes broken off at hub) mudguards crampled and slight signs of bending in some of the lighter chassis members, the body work was shattered at the middle on the right and generally was shaken and cracked.

7. The woman found behind the light engine was seriously injured and was sent to Kharagpur Hospital where she subsequently died and one man whose leg was much hurt was sent to Cuttack Hospital. Most of the other bus passengers got minor hurts or bruises. The accident occurred at 20 hours and the obstruction was cleared at 0.45 hrs. The local Railway staff and some local inhabitants did what they could for those injured at once after the accident later on taking them to the Station waiting hall at about 22 hours. Two Sub-Assistant Surgeons arrived by next trains at 23.20 hrs. and 23.35 hrs. The man taken to Cuttack left at 1.13 hrs. and the woman taken to Khargpur left at 1.28 hrs. each under the care of a Sub-Assistant Surgeon. Details of injuries (to 15 persons) were given in the evidence of the Sub-Assistant Surgeon, Cuttack.

Description of the locality of the Accident.

1. Jajpur Road Station is a single loop crossing station, the main line lying north and south with passengers platform and station building on west and loop on east. Just outside the facing points at each end there is level crossing, that at the north end where the accident occurred being the more important, and carrying fairly heavy motor-bus traffic between the station building on the west and Jajpur, an important town 15 miles off, on the north-east.

2. At this level crossing the road is at right angles to the track for 300 feet on each side, height about 3 feet above ground humping up to about 5 feet at the crossing. The track is straight from the station to far beyond the Up Outer Signal.

3. The gate-lodge lies in the north-west angle about 22 feet back from road and main line. In the north-east angle there is a Dak Bungalow with a high hedge round its compound adjacent to the road but 75 feet back from the main line. Otherwise the site is clear except for some trees just east of the main line 700 feet north of the level crossing, and a few odd small trees dotted about.

4. The level crossing is metalled about 8 feet wide and gate-posts are 12 feet 6 inches clear apart and 4 feet high with a lifting bulli or timber beam on top hinged at one gate-post and fastened by a chain at the other, west bulli being hinged at south end and east bulli at north end. The bullies usually have a disc at their centre and are painted white all over, and each is illuminated by a bulls-eye lamp on a post 4 feet high placed about 12 feet away at the side of the road and directed towards the disc. There are no lights showing red to railway when gates are open to road traffic, and red to road when gates are closed to road traffic.

5. The clear distance between the east and west gate-posts through which the motor-bus was pushed is 21 feet. The overall length of the motor-bus is 16 feet 5 inches.

Conclusions.

1. The S. M., A. S. M., night gateman Sidhi Behara, lamp-filler and driver of light engine had all been at Jajpur Road Station for 5 years or more before

the accident. The driver of the motor-bus had been driving it from Jajpur Road Station to Jajpur for 8 months before the accident.

2. The hours of duty of the night gateman have always been 18 hours to 6 hours. Prior to taking over charge of the gate from the day-gateman, the night-gateman has to go to the station building to get his hand signal lamp. The day-gateman has been instructed not to leave the gate until the night-gateman arrives. The gate equipment is simply handed over from one gateman to the other at change of duty. The presence of the night-gateman is recorded next morning on his going to the station building for that purpose after duty. There were no particular instructions that the station master on duty should go to the gate shortly after change of gate-duty and verify that it had taken place properly, but it has been stated that the gate was so visited occasionally. Such visits however were not recorded in the station diary.

3. I conclude that the night-gateman there by name Sidhi Behara was absent during his hours of duty (18 hrs. to 6 hrs.) without the permission of his superior officer and without special instructions and without a relief which constitutes breach of old General Rules 230; 231 and 358. For :—

(*a*) Both the S. M. and A. S. M. have stated that they saw Sidhi Behara at the station shortly after 18 hours on the night of the accident taking away his hand signal lamp, and the A. S. M. who was on duty has stated that he had no reason for thinking that Sidhi Behara had not thereafter gone at once to his gate.

(*b*) The day-gateman has stated that on the night of the accident he was relieved by Sidhi Behara at 18 hours.

(*c*) The driver of the light engine that met with the accident has stated that very shortly after the accident he found no gateman at the level crossing. The S. M. and A. S. M. have corroborated this, they also shouted and searched around for the gateman. They all found the gate-lodge locked up.

(*d*) The night-gateman Sidhi Behara has stated that he went to the station at about 18 hours but left his lamp as he was sent by the S. M. to do private work in the S. M.'s quarter. When this work was over he went to the station, got his lamp, and started to go to his gate, but the accident occurred whilst on his way.

(*e*) The S. M. has stated that on the night of the accident Sidhi Behara was not sent to do private work in his quarter. The S. M. has admitted that in Sidhi Behara's leisure hours he (the S. M.) did use Sidhi Behara for private purposes with his willingness. The A. S. M. has stated that he was unaware of this, but a pointsman has stated that he was aware of this being done. Enquiries have been made by the Bengal-Nagpur Railway, but it could not be ascertained that the night-gateman did private work for the Station Master. I personally cannot credit that the S. M. would have kept the night-gateman working in his quarter, with trains passing, even if the day-gateman had received a general order not to leave till the night-gateman arrived.

(*f*) The S. M. and A. S. M. both stated that in the past there had been irregularities on the part of the night-gateman Sidhi Behara in connection with his presence at his gate and with the fastening of the gates (chiefly during the early hours of his duty). On one occasion a report about this was made to the S. M. by the Magistrate.

(*g*) As regards the conflicting statements in items (*b*), (*d*) and (*e*), there are other conflicting points in the evidence generally, for instance the day-gateman stated that the night-gateman Sidhi Behara did not make over to him flags padlocks, etc., at the transfer of duty but locked them up in the gatelodge during the day whereas the latter stated that he did make them over ; the station staff are more or less in two camps namely those for and those against the Station Master, the latter including most of the menials and this is reflected in the evidence, some of which did not impress me favourably. On the whole I consider the version of occurrences and irregularities given by the night-gateman Sidhi Behara as the less acceptable.

4. *As regards the level crossing gates being open.*—I conclude that the gates were open when the motor-bus approached the level crossing, constituting a breach of old General Rule 352 (4), for which I hold the night-gateman Sidhi Behara responsible. For :—

(*a*) The motor-bus driver the motor-bus cleaner and two passengers sitting on the driver's seat have all stated that the motor-bus electric head lights were burning, and the beam of light from them shewed the gates to be open, also that the motor-bus went on to the level crossing without stopping. At least one head light burning and the bus not stopping has been corroborated by the pointsman at the facing points.

(*b*) There are no special instructions at these gates modifying Rule 352 (4).

(*c*) There were I am convinced irregularities in connection with the two gate padlocks prior to the accident so that they were not on the gates where they should have been, which irregularities I attribute primarily to the irregular behaviour of the night-gateman Sidhi Behara. I suspect that at the time of the accident one of the gate padlocks was on the gate-lodge.

(*d*) The two gate padlocks when inspected a week afterwards were found to be old and not in perfect order as they had to be much manipulated to make them lock, but they did eventually lock.

(*e*) The bulli-gates and their fastenings showed no signs of having been tampered with.

5. *As regards the visibility of the gates to approaching road traffic.*—I conclude that on the night the accident occurred the gate illumination lamps were not alight and that the gates were not as visible as they might have been. I am also of opinion that for some months at least preceding the accident the gate illumination lamps had seldom if ever been lighted. For :—

(*a*) The driver of the light engine, the S. M. and A. S. M., the driver and greaser of the motor-bus, and two passengers in the motor-bus have all stated that the gate illumination lamps were not alight just after the accident.

(*b*) The driver of the light engine and the driver of the motor-bus have both stated that they have never seen the gate illumination lamps alight. On the contrary the S. M. has stated that he has seen them alight some times.

(*c*) The lamp-filler has stated that the night-gateman Sidhi Behara only brought the gate hand signal lamp to be filled.

(*d*) Sidhi Behara has stated that since his appointment as gateman there had never been any oil for the gate illumination lamps and so they had never been lighted. He also stated that the gate illumination lamps had never been inspected at the gate or been taken to the station for inspection. Gate illumination lamps are always padlocked to lamp-posts to prevent them being interferred with, but Sidhi Behara stated that before the accident there had been only two gate padlocks and no lamp padlocks. 2 lamp padlocks were got from the local bazaar by the S. M. shortly after the accident.

(*e*) The day-gateman has stated that he has never had the gate-illumination lamps alight though in the cold weather the ends of his duty are without daylight.

(*f*) On inspection in the course of the enquiry the following were noted :—

(*i*) the posts carrying the gate illumination lamps instead of being vertical so that the lamps would illuminate the gates when closed were leaning back at about 30° with the vertical so that the lamps shone up into the sky and would only illuminate the top end of the bulli-gates when standing vertical, *i.e.*, fully open. Had the lamps been regularly lighted in this position I think that they would soon have been rendered useless by burning.

(*ii*) the white paint on the gates and gate-posts was somewhat old and dirty and did not show up well,

(*iii*) the disc on the centre of the east gate had been off for several days ; and was lying with the S. M.

6. *As regards whether the light engine or its crew in any way contributed to the accident, I conclude that they did not,* for :—

(*a*) The driver of the light engine (and his crew), the pointsman at the facing points, the S. M. and A. S. M. all state that the light engine had its proper head lamps (two red) alight at the time of or just after the accident. (This engine did not carry an electric head-light).

(*b*) No " danger " light was shown at the level crossing towards the driver, and under the B. N. R. subsidiary rules the driver would not expect to see any " all clear " light at the level crossing ; so that in the absence of a red " danger " light at the level crossing he would take it that the level crossing was clear for him.

(*c*) The motor-bus had at least one head-light alight as it approached the level crossing and this shewed up the gates so that those in the bus could see them. The driver of the light engine has stated that there were no lights on the bus (which is corroborated by the engine crew and a driver learning the road), but in this I think that he (and the others) was mistaken ; possibly the dak bungalow compound and then the engine itself masked the lights when the bus was some distance from the crossing, and when close to the crossing the bus slowed down to go over the hump there which made the lights dim. In any case there is nothing abnormal in bus lights at or near a level crossing, and in the circumstances I don't think that the engine staff could have spotted that the bulli-gates were open till right on them.

(*d*) The engine was probably running at about 10 miles per hour as it approached the level crossing for had it be going faster the bus would have suffered much more crumpling from the impact ; and it stopped in 115 ft. from the level crossing. I do not think that either speed or stopping distance were excessive.

7. *As regards whether the motor-bus or its crew in any way contributed to the accident* :—

(*a*) The motor-bus was overloaded apparently 29 persons against 20 licensed total. 3 passengers were seated in front alongside the driver (1 on driver's right 2 on driver's left) but I don't think that that interfered with his driving ; also I don't think that the overload affected the running of the bus except that it would probably cause the hump at the level crossing to be taken somewhat slow and this in turn would dim the head-lights particularly if taken on top gear. I base the above on the statements of the two bus passengers Chandramani Sikdar and Bairagi Ratha which I accept in preference to the statements of the bus driver and cleaner about the occupants of the driver's seat.

(*b*) The overload would directly affect the number hurt if they exceeded the licensed capacity of the bus.

(*c*) Owing to the overload the owner's son was sitting in the right doorway of the driver's compartment and the greaser was sitting in the left doorway. The statement of bus passenger Bhairagi Ratha indicates that the driver of the bus had suspicions that there was an engine coming for he states that the driver asked the " motor-walla " about it, to which the latter merely replied " the gate(s) is open, go on " and go on the driver apparently did.

8. *Action taken.*—The night gateman Sidhi Behara was convicted under section 101 of the Railway Act IX of 1890 and sentenced to six months imprisonment.

Recommendations.

1. There is, I think, need for a much stricter inspection and check of level crossings and their equipment at site than has been the case in the past, both by local staff and by supervising staff. All visits should be definitely entered in the station diary when made by the station staff. Supervising staff will presumably record their visits in their note book or diary.

Firstly the maintenance of gates and their equipment should be regularly and frequently inspected including :—

(*i*) Gate padlocks to be good quality and marked for identification, full number and no bazaar substitutes, no lost keys and bazaar replacements. Also if possible padlocks should be affixed to their gates.

(*ii*) Chain fastenings to be such that they cannot be slipped off over the top or end. Where possible they should go " through ".

(*iii*) All discs to be on and paint to be fresh and clean.

(*iv*) Gate lamps to be properly carried and focussed.

Secondly the use of gates and their equipment should be regularly and frequently checked including :—

(*v*) All padlocks in good working order. None used for locking up gate-lodge.

(*vi*) Lamps properly lighted and shewing correctly.

(*vii*) No staff absent or equipment missing.

(*viii*) Transfer between day and night gateman properly effected on time.

(*ix*) G. and S. Rules regarding fastening gates carried out.

2. A review of existing level crossings in the light of present conditions, and a steady programme for such alterations in accordance with the Standard Specification for Level Crossings as are found necessary, seems advisable.

APPENDIX B.

SKETCH OF SITE OF ACCIDENT.

SCALE ROUGHLY 1"=100'

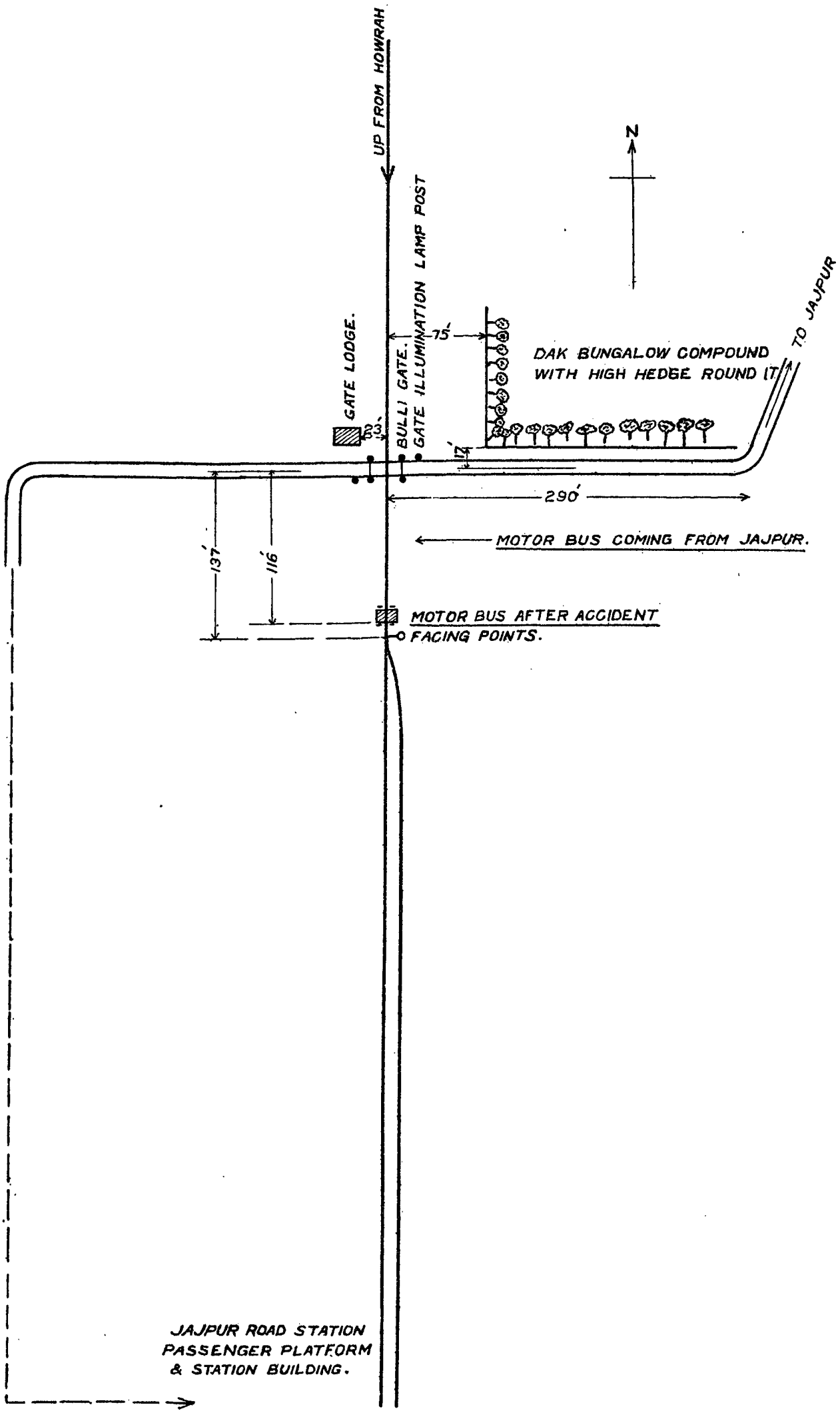


Photo.-Zinco., March, 1930.—No. 1073.-550

NORTH-WESTERN RAILWAY.

COLLISION BETWEEN A SHUNTING ENGINE AND A MOTOR-BUS AT A LEVEL CROSSING IN THE ORDNANCE YARD AT LAHORE CANTONMENT AT 10-30 HOURS ON 10TH JULY 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 80|29-1062, DATED 31ST JULY 1929.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I submit herewith my report on the enquiry held into the circumstances attending the collision between a shunting engine and a motor-bus at an unmanned level crossing in the Ordnance Yard at Lahore Cantonment at 10-30 hours on 10th July 1929.

2. I received intimation of the collision on 10th July and held the enquiry on 12th July 1929 at Moghalpura ; preliminary statements were taken by a committee of Officers of the Lahore Division on 10th July and were accepted by me.

3. The following officers attended the enquiry on 12th July 1929 :—

H. D. Furley, Esq., Divisional Superintendent, Lahore.

A. Cornish Esq., Divisional Rolling-Stock Officer, Lahore.

E. A. Rokeby, Esq., Divisional Transportation Officer, Lahore.

E. C. Whelan, Esq., Divisional Engineer, Lahore.

S. Alamgir, Esq., Extra Assistant Commissioner, Lahore.

Rai Sahib Dwarka Nath, Esq., Sub-Divisional Officer, Railway Police, Lahore.

Description of accident.

4. On 10th July 1929, Motor-Bus, No. P.-5128-A., collided with Shunting Engine No. 2233-H.G.|S., while the latter was running tender foremost across an unmanned level crossing in the Ordnance Yard at Lahore Cantonment ; after the collision the engine stopped on the crossing and then moved forward to enable the bus to be released. The weather was fine and clear and the collision occurred in broad day light.

5. The footboard on the tender of the engine was slightly damaged ; the front wheels, the radiator, the bonnet, the steering wheel and gear, the brake gear and the lamps of the bus were badly damaged ; the remainder of the bus did not appear to be damaged though parts may have been affected by the impact of the collision.

6. None of the railway staff were injured, of thirteen persons on the bus one was seriously injured and subsequently died in hospital, nine others received simple injuries and after treatment proceeded to their destinations.

7. The speed of the engine was about 5 miles per hour and of the bus about 20 miles per hour at the moment of the collision. The engine was returning light to Moghalpura along siding No. 3 after working in the Ordnance Depot and had just got up to the crossing when the bus crashed into it ; the bus had evidently been running from Harike at excess speed and when it approached a culvert close to the crossing which has ramped approaches, the driver accelerated speed to surmount the culvert and on coming down the far side either failed to apply his brakes or did so too late.

Description of the locality of the accident.

8. Approaching the Ordnance Depot from Moghalpura station, siding No. 1, crosses the road and had a rake of wagons in it south of the road with the leading vehicle 46 ft. clear of it ; Siding No. 2, takes off siding No. 1, 300 ft. north of the road at points No. 22 and crosses it, a rake of wagons was standing in it with the leading vehicle 113 ft. clear of the road ; Siding No. 3, takes off Siding No. 2, 40 ft. north of the road at points No. 26 and the lead of the crossing traverses the road at the same place as siding No. 2, sidings Nos. 4, 5, and 6 are well away from the road and south of it.

North and South of the road and on either side of it are Kucha drains over which the sidings are carried by a 10 ft. girder bridge and a 2 ft. open top culvert respectively. The whole of the yard is more or less level, on the South a good view of the road is ordinarily obtainable from sidings Nos. 1 and 2, from sidings Nos. 3—6 the view towards Harike is clear but towards Lahore it is partially obscured by trees and the boundary wall of the Bansi Sagar Tank. On the north the view from the track is partially obscured by high crops.

9. Approaching Lahore from Harike the road is level to within 300 ft. of siding No. 1, rises at 1 in 60 for 200 ft. is level for 25 ft. on the culvert over the Shalamar Escape, falls at 1 in 25 for 60 ft. and then traverses sidings Nos. 1 and 2 on the level. The culvert over the escape has parapets 61½ ft. long and 2 ft. above the road. The road has no trees bounding it except at some distance away where there are a few scraggy acacias which do not obstruct the view. The ramp from the culvert to siding No. 1 has a tar macadam surface the remainder of the road is ordinary stone metal.

10. From the fotplate of an engine on siding No. 3, 137 ft. away from the level crossing it is possible to get a view along the road towards Harike for 55 ft. from siding No. 1, this view is obtained as soon as one clears the rakes of wagons on sidings Nos. 1 and 2 ; a similar view of the railway from the same point on the road is obtainable of an engine on siding No. 3.

11. There were no conventional warning signs on the road nor were there any warning boards on the railway. The road was Kucha upto some 18 months ago when it was metalled and re-classified as an arterial road ; no advice of the change was given to the railway and no rules were ever framed by the railway for the control of train movements across the road.

The plan attached shows relative position of road and rail and other relevant matter.

Conclusions.

12. The evidence, as is usual in such cases, has been given by the parties, concerned in the collision, with a view to exonerating themselves and to blaming others.

Reasonable conclusions can however be drawn from the evidence of disinterested persons—chiefly some police officials who were on the bus and an eye-witness of the collision.

13. The evidence as to the bus being first seen by Shunter Barkat Ali and Jemadar Bodi when it was only 20 ft. away must be rejected in view of the fact that from an actual test it is possible to see along the road for 55 ft. from siding No. 1 from a point on siding No. 3, 137 ft. from the crossing ; if it is accepted then neither of these persons was keeping a look out. Their evidence that the engine was stopped some 50 ft. from the crossing, and then proceeded ahead appears doubtful and I am inclined to believe that they left the Ordnance Depot at a speed of 5 mile per hour and seeing nothing on the road moved forward, which they were justified in doing ; they had the right of way and rightly assumed they could move over the level crossing and that any vehicle on the road must pull up.

14. I reject their evidence as to the engine whistling when approaching the crossing as Dr. Narinjan Singh an eye-witness and Sub-Inspector Sayed Mohd. Asghar Shah and constables Jagat Ram and Niaz Ahmad who were on the bus definitely state they never heard any whistle, they are intelligent and reliable persons and I accept their statements.

The same witnesses state Bus Driver Buta Singh never sounded his horn when approaching the level crossing though he declares he did and I reject his evidence on this point.

15. Shunter Barkat Ali, Jemadar Bodi and Fireman Sharif Beg were a poor set of witnesses as regards intelligence and reliability and in their endeavours to clear themselves were more fools than knaves. I consider they should be warned for not displaying greater care in shunting, more so as no orders had been given to exercise caution. Shunter Barkat Ali has been working on this section for three months and Jamadar Bodi for three years.

16. Bus Driver Buta Singh was a very unreliable witness he frequently retracted his statements and had evidently been tutored to do this. On his own admission and on the evidence of Sub-Inspector Sayed Mohd. Ashgar

Shah and constables Jagat Ram, Niaz Ahmed and Mohd. Hayat he was running at 20 miles per hour and had been doing so for some time though he is only licenced to run at 15 miles per hour.

The same witnesses as well as Dr. Narinjan Singh state he never slowed down on approaching the crossing nor exercised any caution.

He was not keeping a proper look out or he would have seen the engine before he got to the culvert as it was moving to get across the road ; he evidently saw it too late and then endeavour to cross ahead of it and applied his brakes too late and crashed into it. He states his brakes were in good order, on examination the brake bands were found to be badly worn all rivets being shorn and no adjustment could be made to take up the wear ; his brakes were last examined by the Police Inspector of Traffic on 8th April 1929, I understand this should be done quarterly. If he had shown any presence of mind he could have turned the bus to the left and at most have run into the narrow ditch by the side of the road.

He committed a rash and negligent act in trying to cross ahead of the engine and is solely to blame for the collision. He has been driving on this road for one month.

17. There has been a lack of co-operation between the Civil and Railway administrations in that when the road was metalled and re-classified as an arterial road no intimation was given by the former to the latter ; and further when the railway staff saw this had been done no enquiries were made as to a possible increase in road traffic.

The question too of removal or redesign of the culvert over the Shalimar Escape should have been jointly looked into. In its present state it is a danger with a grade of 1 in 25 and a tarred surface terminating at siding No. 1, a test was made with a loaded bus at 20 miles per hour on the 1 in 25 ramp and it was only able to pull up in a length of 105 ft. the brakes were in fair order ; it is bad enough during day light but at night with no lighting of any sort, with wagons stabled in the sidings right up to the crossing and engines moving about in case of an emergency it is extremely dangerous.

It is quite a simple matter to syphon the escape under the road or move the culvert to at least 70 yards away by re-aligning the channel on either side.

18. If the station master Moghalpura, who is in charge of the Ordnance Yard, had been alive to the change in the situation he should have laid down rules himself or asked for higher authority to do so for the control of train movements in the yard and across the crossing. He might also have raised the question as to the crossing being provided with barriers. Normally work in the Ordnance yard only goes on during the day.

19. The occupants of the bus were a Sub-Inspector and three police constables five accused persons and three others ; one in excess of the schedule load.

It is rather curious the police did not assert their authority in forbidding the bus to travel at excess speed and with one passenger extra.

Recommendations.

20. Re-classification of unmanned level crossings should be done by close co-operation between the Civil and Railway Administrations.

21. Suitable barriers across such sidings to be provided and normally locked against rail traffic, when rail movements have to take place across the road the barriers will be opened and closed across the road ; on completion of the work the barriers to be restored to their normal position. The shunting Jamadar to be responsible for the locking and unlocking of the barriers.

22. Suitable warning boards to be erected for day work on both road and rail ; if night work has to be done adequate lighting to be provided.

23. The removal of the culvert on the road or its conversion into a syphon is an urgent measure and should be undertaken at once.

24. Suitable rules regarding train movements to be framed for these scattered yards, where public roads cross them ; the work is generally left to low paid staff and too much reliance must not be placed on them ; among other things the stabling of wagons within 100 ft. of a road crossing should be forbidden.

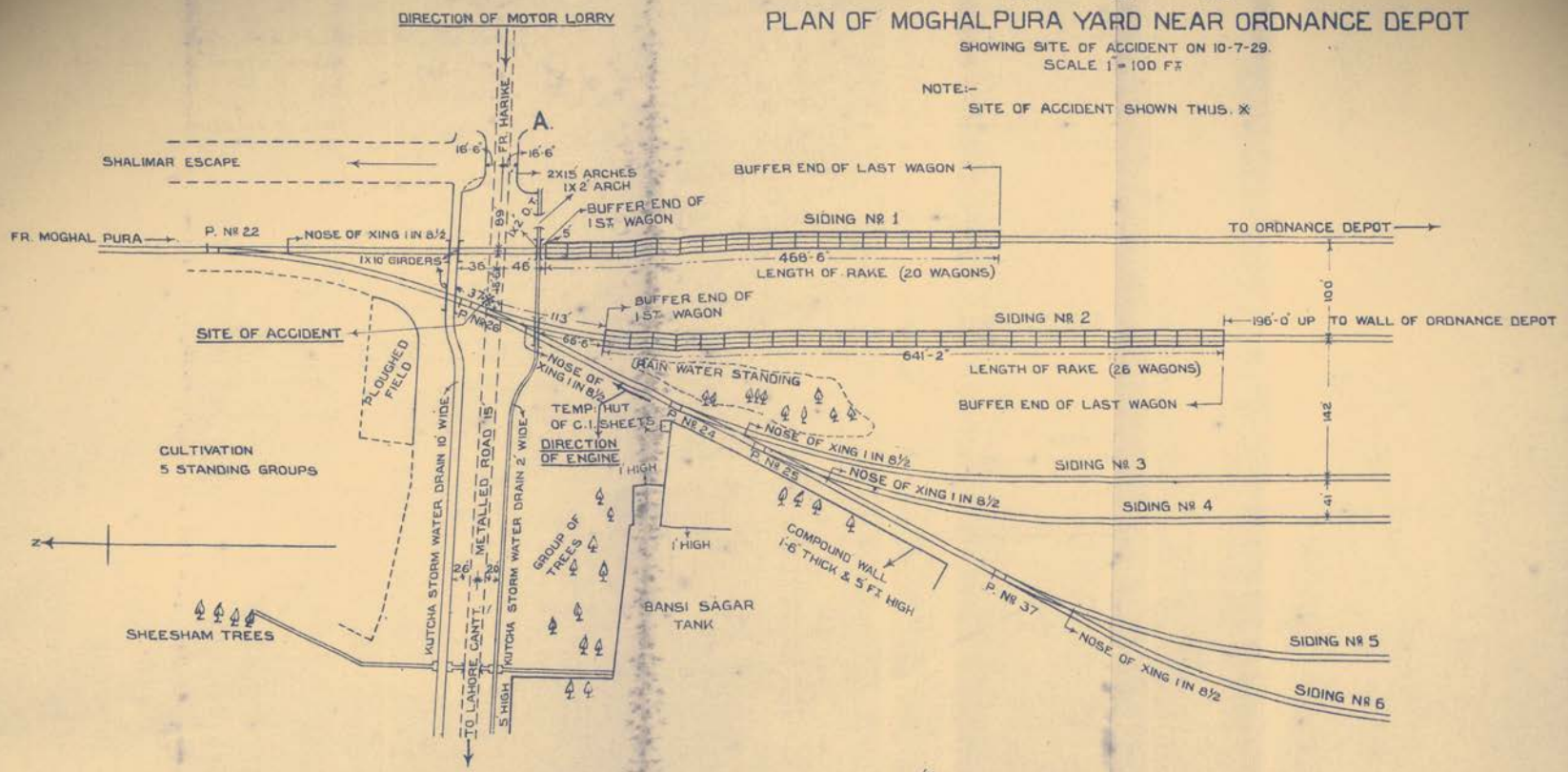
APPENDIX "D"

N. W. R.

PLAN OF MOGHALPURA YARD NEAR ORDNANCE DEPOT

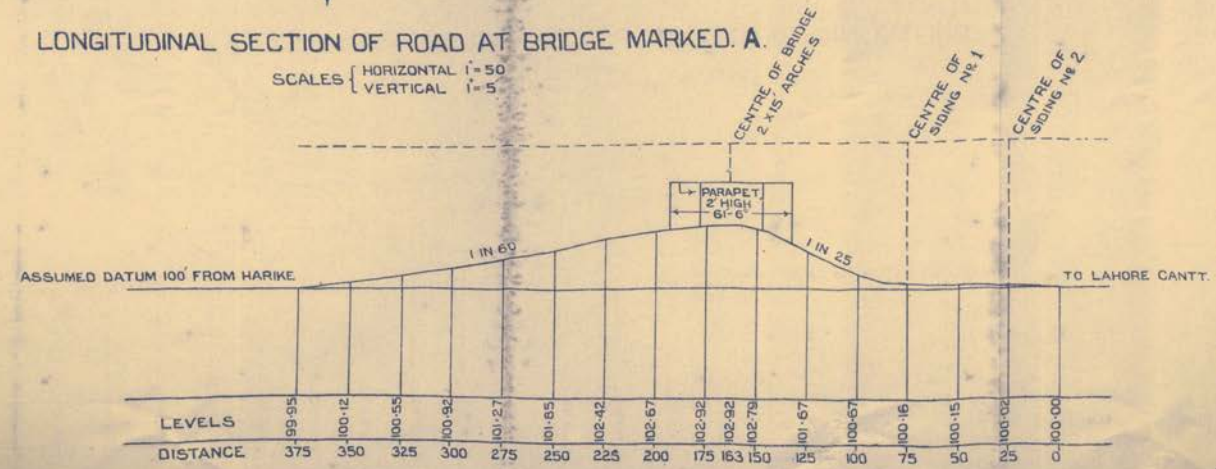
SHOWING SITE OF ACCIDENT ON 10-7-29.
SCALE 1" = 100 FT.

NOTE:-
SITE OF ACCIDENT SHOWN THUS. X



LONGITUDINAL SECTION OF ROAD AT BRIDGE MARKED. A.

SCALES { HORIZONTAL 1"=50
VERTICAL 1"=5



CASE Nº 4-T/191
Nº 29-CANTT./13-7-29. L.H.R.

SD. E. C. WHELAN 13/7/29.
EXECUTIVE ENGINEER I.
N.W.R. LAHORE.

Photo.-Zinco. February, 1930.—No. 1045.

H. H. THE GAEKWAR'S BARODA STATE RAILWAYS.

ACCIDENT TO NO. 26, DOWN MIXED TRAIN AT MILE 34|4 OF THE KOSAMBA-UMERPADA BRANCH (2 FT. 6 IN. GAUGE) ON 13TH JULY 1929.

FROM MR. G. W. N. ROSE, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1175 OF 1929, DATED THE 30TH JULY 1929.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.|18, dated 21st March 1923, I beg to submit my report on an accident which took place on the 13th July 1929, at mile 34|4 of the Kosamba-Umerpada Branch (2 ft. 6 in. gauge) of H. H. the Gaekwar's Baroda State Railways, to No. 26, down mixed train.

2. I was away in Kathiawar when advice of the accident reached me, and being thus unable to investigate at once, I fixed July 22nd for an inquiry into the accident. In the meantime Rai Saheb Manilal, Traffic Superintendent, Baroda State Railways, Mr. L. S. Mody, Deputy Locomotive Superintendent, and Mr. D. B. Shukla, Executive Engineer, reached the site and held a joint inquiry on the 14th July. After inspecting the scene of the accident with these officers on the 22nd, I did not find it necessary to recall the witnesses or to hear further evidence.

Description of accident.

3. No. 26, Down mixed, consisting of engine No. 22 (0-6-2 type, heaviest axle-load 5 tons), with tender in rear, one four-wheeled covered wagon (empty), one bogie upper and 3rd class coach and one bogie 3rd class brake van, left Zankhvav station, mile 26 of the branch, with a caution order issued at the request of the Permanent-Way Inspector, Zankhvav, after a night of heavy rain, warning the driver to look out for engineering signals. On arrival at mile 34|4 at 13.17 hours, the train was halted at a red flag put up by the Permanent-Way Inspector, who left a gang there at work and gave instructions that the train should not be allowed to pass until his own return from inspecting the remainder of the branch further ahead. He returned after the train had been halted about 20 minutes, and at 13.52, it was allowed forward.

4. It had only moved a short distance when the track beneath the tender began to slide out to the left, tilting to such an angle that the tender was overturned and rolled down the bank carrying with it the engine, the following 4-wheeled goods wagon and the first of the two bogie coaches. The second coach remained on the rails. The engine lay with its wheels in the air, the tender on its side, both parallel to the track at the foot of the bank ; the wagon and coach were not overturned. The coupling all held.

5. The driver, Gosai, was carried down and killed on the spot ; the fireman jumped clear, while the few passengers in the train escaped injury.

Description of the locality of the accident.

6. The accident took place on a length of straight track which forms the approach, over about three chains of bank, to a girder bridge No. 78, one span of twenty feet. The maximum height of bank is about 23 feet. The width of formation as constructed was 12 feet, with 1½ to 1 slopes. The track consists of 31 lb. flat footed rails upon wooden sleepers, earth ballasted at this spot.

7. When seen on the 22nd July, the bank had settled several inches in relation to the bridge, the shoulders of the bank had largely disappeared, and the track, which was otherwise undamaged, was lying in a curve to the left off the centre line of the bank opposite the derailed tender. It had been held to line ahead by the bridge, and it had not moved in rear, under the last vehicle of the train still standing on the rails. The centre of the displaced track was tipped up at a steep angle following the slope of the bank.

8. The leading end of the engine was within a few feet of the bridge when the accident occurred.

Conclusion.

9. The Zankhvav-Umerpada section of the branch had only recently, on 1st July 1929, been opened to regular traffic. The earthwork generally had been through a rainy season, but the filling behind the abutments to bridges as at Bridge No. 78, had been done since the previous year's rains.

10. Very heavy rainfall occurred on the night of the 12th-13th July. On the morning of the 13th, 10 inches of rain at Kosamba, 12 inches at Mangrol Vadhi (mile 14) and 14 inches at Vankal (mile 20) were measured as the falls of the previous 24 hours. Heavy rain continued on the 13th and was falling when the accident took place.

11. As a result of the abnormal rain, the approaches to bridge No. 78, sank, and the slopes of the bank must also have been guttered to some extent. The foot of the bank had not been damaged in any way by the flow of the stream passing through the bridge. From the appearance of the track on the 22nd, I infer that the formation must have been in a somewhat shoulderless condition, and the track packed up rather high, which taken in conjunction with the clay soil of the bank, extremely slippery when wet, was sufficient to start the side ways slide of the sleepers immediately an uneven settlement of the track took place.

12. The accident was thus due, I consider, to a lack of judgment on the part of Mr. Fazal Elahi, the Permanent-Way Inspector in attempting to pass the train over a formation which, in spite of the repairs which had been carried out, was still unfit in consequence of the abnormal rainfall.

Remarks and Recommendations.

13. Mr. Fazal Elahi has served the Baroda State Railway as a Permanent-Way Inspector since 1923, but in April 1928, as he " was not found up to the mark for maintenance ", he was brought under reduction. He was forthwith re-engaged in a temporary post on lower pay and was employed on construction, where he remained as Permanent-Way Inspector after the extension was opened to traffic.

14. Mr. R. C. Desai, the Assistant Engineer in charge of the construction of the extension, had been relieved of his responsibility for the work from 1st July, although he remained at his headquarters at Vankal (mile 20), dealing with the final bills, prior to his transfer, which was to have taken place a few days after the accident. There was no other officer of the system on this detached branch, and it is to be regretted that a man of Mr. Fazal Elahi's antecedents should thus have been left in a responsible position.

15. I am of opinion that in these circumstances it would have been proper for Mr. Desai, in view of the abnormal rainfall, and of the fact that 26 down reached Vankal an hour late owing to flood delays *en route,* to have accompanied the train forward over the new extension and to have returned with it in the afternoon, and it is unfortunate that he did not feel moved to do so.

16. (*a*) Steps should be taken to ensure that only fully competent staff are employed in connection with the running of trains, especially on detached branches where no officer is at hand to assist in an emergency.

(*b*) It should be impressed on all concerned that it is their duty to consider safety, first and foremost, in cases where owing to damage to way or works, there is any doubt as to their fitness for traffic.

BENGAL AND NORTH-WESTERN RAILWAY.

DERAILMENT OF 57 UP PASSENGER TRAIN, AT MILE 266|9 OF MAIN LINE NEAR BHATNI JUNCTION AT 22.55 HOURS ON 1ST AUGUST 1929.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 424-T., DATED THE 5TH SEPTEMBER 1929.

In accordance with Rule 7 of Railway Board's Notification No. 120-T., 18 dated 21st March 1923 and in continuation of the preliminary report submitted under my No. 347-T., dated 6th August 1929, I beg to submit a full report of the enquiry held by me into the circumstances attending the derailment of 57 Up B. and N.-W. Railway Passenger train at M. 266|9 of their Main Line on August 1st 1929.

2. I was informed of the accident on the afternoon of 2nd August and visited the site and made a preliminary enquiry on 3rd August. Later a full enquiry was held at Bhatni on 9th August at which the Railway Police, Magistrate and District Officers of the Bengal and North-Western Railway were present.

Description of the accident.

3. At 22.55 hours on August 1st, No. 57 Up B. and N.-W. Railway Passenger train was derailed at M. 266|9 about half-way between Bhatpar Rani and Bhatni Junction stations on the Bengal and North-Western Railway Main Line between Katihar and Lucknow.

4. At the point of derailment the 8 fish-bolts and 4 plates at the two ends of one rail had been removed as had also all the outer spikes of this same rail.

5. The Engine of 57 Up Passenger train running about 25 minutes late and at about 30 miles per hour as it came on to the rail that was unbolted and unspiked, pushed this outwards, struck the end of the next rail, pushed this rail forward about 9 feet, buckling this and the next rail, derailed and carried on for a total distance of 230 feet where it came to rest parallel to the track but with the wheels of the outer side half-way down the bank and embedded in it.

The 3 coaches next the Engine consisting of two III class bogies and one bogie III class and Brake-van were thrown down the bank and capsized. The rear of the leading carriage being telescoped for half its length into the 2nd bogie.

The 4th and 5th vehicles both bogie III class coaches were derailed but remained standing on the bank.

Site of the accident.

6. The accident occurred at M. 266|9-10 of the Bengal and North-Western Railway Main Line about half-way (*i.e.*, 4 miles from Bhatni) between Bhatpar Rani and Bhatni stations.

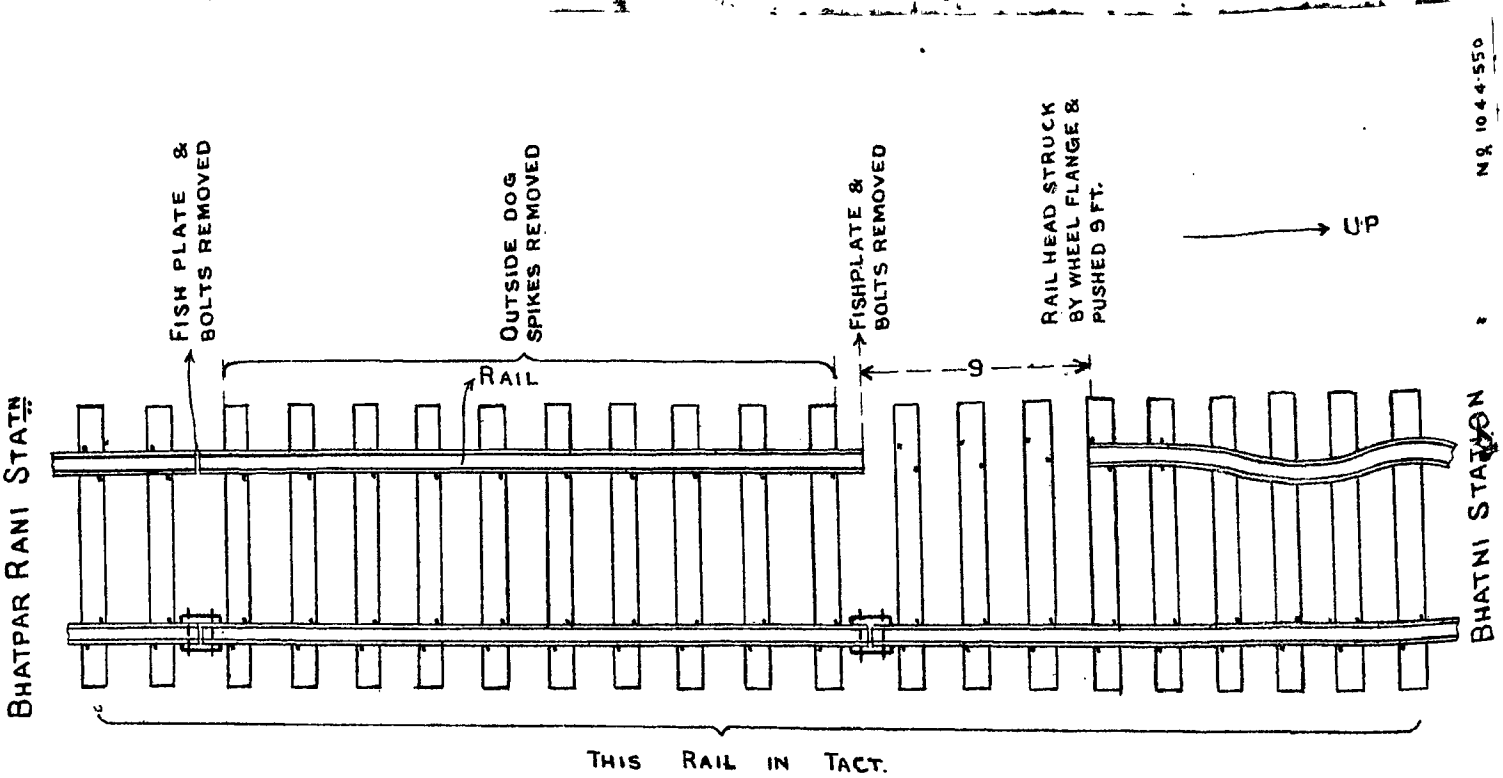
7. Formation at the site is in bank about 5 feet high with straights of a mile or more on either side. There are a few small trees near the bank but no jungle and the country is open and flat on either side.

8. The nearest Level-crossing is No. 115 about half a mile away. There is a small village about 300 yards from the site and two of the gangmen of the length reside in this village.

9. There are no gang huts provided on the section and all gangmen live in the villages round about keeping their tools for the night in the gate lodge nearest to where they finish work for the day.

CAUSE OF THE ACCIDENT.

10. The accident was caused by the removal of 2 pairs of fish-plates with their bolts and all the outside spikes of one rail.



THE EVIDENCE.

11. The cause of the accident was apparent from an inspection of the site. The evidence of witnesses was taken with a view to confirm the finding at the site of (1) the tools used for the removal of the bolts and spikes and (2) some of the plates and bolts removed. Also to ascertain the damage done and the steps taken to deal with the killed and injured and to clear the line.

12. Immediately after the accident, one clawed bar for drawing dog-spikes and one fish-bolt spanner were found on the track alongside the rail the fastenings of which had been tampered with. Also 3 fish-plates and 2 fish-bolts were found but no dog-spikes. Therefore there still remain to be found 1 fish-plate, 6 fish-bolts and 12 dog-spikes, the finding of which may help materially in the Police enquiry.

13. One man was killed and two men were seriously injured, one of which died soon after being received into the Civil Hospital at Tahsil Deoria. Ten other people were slightly injured ; 5 of these were attended to but the other 5 were of the party of the Maharaja of Hathua and proceeded to Benares without any medical aid being rendered them because it was refused by the Maharaja.

14. The accident occurred on August 1st, 22.55 hours.

Relief was wired for on the Control wire August 2nd, 0.30 hours.

Relief train arrived at site of accident, August 2nd, 6.20 hours.

Line slewed and re-opened to traffic, August 2nd, 20.00 hours.

Conclusion.

15. I consider the accident was the result of a criminal and successful attempt at train wrecking. It is fortunate that the loss of life and injuries were comparatively light when they might have been so very serious.

I am unable to supply any reason for this crime. Its occurrence on " Red day " may have been a coincidence as also the fact that the Maharaja of Hathua and party were travelling in the bogie next to the Engine and were most likely to suffer in the wreckage.

The reason for the crime and the identification of the criminals are matters for the Police enquiry which is in hand.

16. Medical help was requisitioned early and promptly given, but the Railway's own provision was too late to be of any use. The Compounder in charge of the Newri Sugar Mills came promptly to the site and rendered first aid and the Tahsil Deoria Civil Hospital received and treated the injured.

The Railway Relief Train at Gorakhpur was called for by telephone at 0.30 and arrived at 6.20 or took very nearly six hours to get out 48 miles. This is not a creditable performance, but only to be expected if the components of the train are stabled at Gorakhpur as at present. In this case the steam crane was in the Loco. Shops, which had to be opened and it would appear that the crane had then to be got out from the yard in the shops from amongst a number of wagons awaiting repairs. This entailed considerable shunting.

If a train is called a " Relief Train " it is essential that it should be kept for relief work only and always be ready for immediate despatch as soon as an engine in steam can be attached to it. If the crane is required for use in the Loco. Shops and no special crane can be detailed for relief work, the medical and other vans should be sent out as quickly as possible and the crane follow to clear the line which is not a matter of such urgency.

17. Where no gang huts are provided, I would recommend the provision of proper tool boxes at some gate lodge centrally situated as regards the gang beat. Under the present conditions gangs leave the tools they have had out for the day at the gate lodge nearest where they finish in the evening, and as all tools are not taken out every day they are scattered over the gate lodges of the beat. If my proposal is adopted one gateman is responsible for all the tools of the gang.

NORTH-WESTERN RAILWAY.

ACCIDENT TO 6 DOWN VAN GOODS DUE TO COLLAPSE OF PART OF THE KHANKI RIVER BRIDGE AT MILE 54/13-14 ON KOHAT-THALL RAILWAY ON 24TH AUGUST 1929.

LETTER FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, NO. 91/29-1442, DATED THE 28TH SEPTEMBER 1929.

In accordance with Rule 7 of Railway Board's No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the collapse of part of the Khanki River Bridge at mile 54/13-14 on the Kohat-Thall Railway and the capsising of 2 engines and 5 wagons of 6 Down Van Goods on 24th August 1929.

2. I arrived at Kohat on 29th August 1929 and held the enquiry in the presence of—

D. W. McQuillen, Esq., Divisional Engineer, Rawalpindi.

H. W. Huggins , Esq., Divisional Rolling Stock Officer, Rawalpindi.

A. C. Vining Esq., Divisional Transportation Officer, Rawalpindi.

The site of the accident was visited the same day.

Description of the accident.

3. During the night of 23/24th a violent spate came down the Khanki River, damaged the trunga drop walls of the bridge and undermined the founds of piers Nos. 5 and 6, which tilted down and up stream respectively and towards one another. The tilting had the effect of leaving span No. 7 with little or no support on pier No. 6 and when the leading engine reached it at 6-30 hours, span No. 7 collapsed and precipitated two engines and five wagons into the river and derailed two others on span No. 6. Leading Driver Bahawal Bux felt a lurch to the left on pier No. 5 owing to its tilt downstream, before he could do anything his engine lurched to the right on pier No. 6 owing to its tilt upstream, which probably led to span No. 7 collapsing. On both piers the girders must have had a partial bearing on one edge of the bed plates only as the track was more or less intact. The leading engine fell on its side, the following one was on end and the wagons were piled up on and around them ; two wagons were carried away by the force of the current for about 70 yards downstream. One driver and one fireman were carried down by the current, the former managed to secure a foothold on the remains of an old pier and was subsequently rescued. The fireman was drowned and his body recovered about a mile away. The other driver and fireman were pitched out but managed to climb back on to the bridge over the debris. The three injured persons were taken to Rangu hospital shortly after by Colonel Show who happened to pass in a car on the road, about quarter of a mile away. The weather was fine and clear and it had just dawned. After being attended to, they were sent to the Kohat hospital where they are progressing satisfactorily. They seem to have had a miraculous escape from being crushed to death.

Description of the locality of the accident.

4. Approaching the bridge from Kohat the line swings to the left, passes straight over the bridge and then swings to the right to Raisan.

It rises from mile 54/12 to mile 54/14 at 1 in 100 over the bridge.

5. The bridge consists of 2 spans of 54 ft. 3 of 48 ft. and 4 of 39 ft. plate girders ; abutments and piers are on open foundations in boulders and shingle ; the left abutment and piers 1 and 2 and 5 to 8 are founded some 11 ft. below bed level and the right abutment and piers Nos. 3 and 4 only 7 ft. below. In October 1914 piers Nos. 5 to 8 and the upstream wing wall of the right abutment were washed out by a flood some 5 ft. in depth. These piers were originally founded on a boulder spit which was considered safe against scour but it was completely washed away in 1914 and the piers went with it—this occurred a few minutes after a passenger train had passed over the bridge. After this wash out, a guide bund was built on the right bank and a drop wall was put in some 60 ft. below the bridge one already existing 15 ft. away from the bridge ; the bund and drop walls are built of stone trungas.

Conclusion.

6. From the evidence and records of the bridge it appears that everything was in order on the day prior to the accident and that a voilent spate came down during the night of 23/24th August and destroyed the trunga drop walls ; this led to the bed being scored and piers Nos. 5 and 6 being undermined. Gangmate Ludi Khel and two of his men patrolled the line shortly before the accident and state they found the bridge in order ; it is evident they did not notice that the piers had tilted and that the girders were unsafe. One cannot expect such men to detect a fault like this unless they have been specially trained to look for such results. The tilt of the piers was not great and escaped their notice in the uncertain light before sunrise.

7. I do not consider that any of the staff can be held to blame for the accident ; the design of the bridge which led to the failure of the drop walls and the shallow founds are I consider the cause of the disaster. The lower drop wall was pitched too high and acted as a submerged weir with consequent scour on its downstream face which undermined it, when this failed the same thing happened to the upper drop wall. Piers Nos. 5—8 had trungas around them but these were pitched too high and really obstructed the water-way.

8. The trungas are built in the ordinary way with cross wires and pieces of wire at the intersections to hold them in position. The force of the current had shifted the woof strands and bunched them together leaving the warp strands bare ; having no lateral support they were pushed about and the resultant gaps were big enough to allow the stones in the trungas to become dislodged.

9. I consider that when piers Nos. 5 to 8 were rebuilt in 1914 they should have been founded on wells ; I am told that it was with great difficulty that these piers were founded as low as they were. As the spring level is always high the engineers could not contend with the inflow of water and had to pitch the founds where they could keep down the water. Wells might have been more expensive but they would have ensured the founds going down to an adequate depth and the decision not to use them appears to have been an error of judgment.

10. A feature that came to light during the enquiry was the ignorance of the staff about the disaster of 1914.

I examined the transfer notes given to the Sub-Divisional Officer and Permanent Way Inspector by their predecessors ; they were very sketchy and had no information about bridges, the Inspector of Works who is in charge of the subgrade work of bridges did not get any transfer notes at all ; he heard casually of a washout some years ago. He did not know that the trungas at the end of the floor functioned as drop walls at the bridge as he had no plans. It is probable, their predecessors in their turn never got any information from the men they relieved and so could hand nothing on. Such a state of affairs is unsatisfactory and should be looked into, if the staff had any inkling of the serious trouble of 1914 special orders to patrols could have been issued.

Recommendations.

11. Trungas should be made of woven wire as used by the Punjab Public Works Department and not merely interlaced wire.

12. The question of rebuilding the new piers on well founds and of adequately protecting the existing ones should be considered.

NORTH-WESTERN RAILWAY.

COLLISION BETWEEN A LIGHT ENGINE AND A MOTOR LORRY AT LEVEL CROSSING NO. 27, MILE 301|20, ON THE MAIN LINE NEAR AMRITSAR STATION AT 8-30 P.M., ON THE 26TH AUGUST 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 92|29-1513, DATED THE 8TH OCTOBER 1929.

In accordance with Rule 7 of Railway Board's No. 120-T.|18, dated 21st March 1923, I submit my report on the collision between a motor lorry and a light engine at level crossing No. 27 mile 301|20 on the main line outside Amritsar station at 8-30 P.M. on 26th August 1929.

2. A preliminary enquiry was held by officers of the Lahore Divisions on 27th August 1929, the evidence recorded by them was accepted ; I arrived at Amritsar on 2nd September 1929 and held an enquiry in the presence of—

A. Cornish, Esq., Divisional Rolling-Stock Officer, Lahore.

E. A. Rokeby, Esq., Divisional Transportation Officer, Lahore.

P. C. Taela, Esq., Executive Engineer, Lahore.

Rai Sahib Dwarka Nath, Sub-Divisional Officer, Railway Police, Lahore.

The site of the accident was visited the same day.

Description of the accident.

3. On 26th August 1929 at about 8-30 P.M. while motor lorry No. P.-4152, was crossing over level crossing No. 27, it collided with down light engine No. 2249|11.G., the former was struck amidships and hurled off the down on to the up line. The weather was stormy and as it was raining heavily it was quite dark.

Two lorries were engaged at Amritsar by some fruit vendors and taken to load fruit near the level crossing, which is a " B " class one manned and provided with gates ; as there is one gateman only the gates are normally locked at night. The lorries arrived at the crossing after sunset, the gates were unlocked to pass them and then merely put to and left unlocked as they intended going back in an hours time. After leading up the lorries the gates were opened by the driver of the leading lorry who got across safely, the second lorry was caught by the engine and wrecked, of 6 persons on the lorry 1 was killed, 1 died of injuries and 4 were injured. There was no damage to the railway or to the engine.

Description of the locality of the accident.

4. Approaching from Amritsar three tracks—the up and down main lines and the Pathankot branch—run alongside one another and straight upto mile 301|25 where the last named diverges to the left, along the down line on the left at this point there is a group of lofty castor bushes, then a lot of high Sarkanda grass and some trees along the track at the level crossing at mile 301|20. The gate hut is located here and further on there are more bushes and trees and some quarters attached to the waterworks.

The bushes, trees and grass mentioned above obscure the view from a down train of the Batala approach to the level crossing ; the view of the approach from Amritsar is fairly open to a down train.

5. Approaching from Jullundur along the up line, on the left there is a ganghut close to the track and then a few trees which impair the view of the Amritsar approach to the level crossing, beyond it the view is clear to mile 301|23 ; to the right the view of the Batala approach is practically hidden by the gate hut, quarters belonging to the waterworks, trees and bushes.

6. Both the up and down lines are more or less straight for some distance and practically level ; orchards grow right up to the fencing on both sides.

7. Approaching along the road from Amritsar, one strikes the railway at mile 301|22 and runs alongside it for some 400 feet ; the view of the down line from here is more or less open, the up line is partially obscured by some trees ; the road is on a slight grade right up to the track where it turns sharply to the left to cross it.

8. Approaching along the road from Batala one crosses the Pathankot branch and then drops to a junction with the road from the waterworks, thence passing over a culvert there is a slight rise to the track and right up to it. The view of down trains is a good deal obscured by bushes, grass and trees ; that of the up line is practically hidden by the gate hut, waterworks quarters, trees and bushes.

9. The surface of the level crossing was in good order, but there was no level portion outside the tracks as laid down in the North-Western Railway type for a 3rd (B) class crossing. The gates and fencing were in good order.

Conclusion.

10. It is admitted by gateman Hasan Ali that after allowing the lorries to cross over on the outward journey he merely closed the gates and did not padlock them.

Owing to the rain he went inside his hut, while trimming his lamps the gates were opened by some one for the lorries to return. He is guilty of a breach of General Rule 229.

11. Motor driver Mukand Lal denies opening the gates for the lorry to return but the fruit vendors Dooda, Allah Bux, Mehar Din and Umar Din, who were on his lorry explicitly state the gates were closed and he got down and opened them, I accept their evidence and reject his. He is to blame for opening the gates, but as his lorry got away scatheless he apparently can only be lightly punished for the consequences of his action.

12. Motor driver Hans Raj started off without taking the trouble to see if a train was approaching, he had his screens down to keep out the rain and could therefore see and hear nothing. He committed a rash and negligent act in not taking any precautions and merely followed the first lorry, he is therefore solely responsible for the accident.

13. The headlights of the lorries were apparently in good order and burning brightly ; the engine had oil lights which were burning.

14. Engine Driver Satar Din deserves commendation for sending his fireman with a red lamp to stop 123 up goods which was approaching, also gateman Hassan Ali for similar action as the up line was blocked by the debris of the lorry.

Recommendations.

15. All trees, bushes and grass which obscure the view of both road and rail should be cut down for say 200 ft. along the former and 1,000 ft. along the latter ; in the case of lofty trees lopping of branches up to 20 ft. may suffice ; the level crossings towards Amritsar should be treated in the same way.

16. A census of road traffic by night and day should be taken to see if it warrants the level crossing being reclassified ; the road is the only approach to the waterworks and used by the staff both day and night.

17. If the traffic is heavy enough the question of extending the electric bell warning, from the other gates near Amritsar, to this one might be considered.

L489RD--575—28 6-30—GIPS

Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into Accidents

Which occurred during the

Half-year ending the 31st March 1930

No. 7

Issued by the Government of India
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ASSAM BENGAL RAILWAY.

DERAILMENT OF 123 UP MIXED TRAIN BETWEEN SONAIMURI AND NATHERPETUA ON THE NOAKHALI BRANCH ON 7TH OCTOBER 1929.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 319, DATED THE 27TH MARCH 1930.

I have the honour to submit herewith my report on the above accident as required under Rule 8 of Railway Board's Notification No. 1926-T., appearing in Part I of the Gazette of India, dated March 22nd, 1930. The report is based on enquiries made by a Committee of District Officers of the Assam Bengal Railway and by my predecessor Mr. E. L. Manley, M. Inst. C. E., at Natherpetua station, and on the spot, on the 8th, 11th and 12th October 1929.

2. On the 7th October 1929, 123 Up Assam Bengal Railway Mixed Train, consisting of—

III Class Bogie No. 6078.
Inter and Brake van Bogie No. 595.
III Class Bogie No. 3841.
III Class Bogie No. 1200.
I and II Class Composite No. 1516.
Brake van Bogie No. 1234.
Iron covered goods No. 1729.

Total length of train behind Engine 291 feet, drawn by a new Y F type Locomotive No. 180 (maximum axle load 8-1|3 tons) was proceeding from Sonaimuri to Natherpetua on the Noakhali Branch, on which a speed restriction of 25 miles per hour is in force, when it was derailed near mile 93|2 about half way between the two stations. The train was vacuum *braked* throughout.

3. The engine appeared to have left the rails first, travelled 140 feet along the sleepers and then dived down the 3 foot bank to the left, taking the tender with it and partially capsizing. The III Class Bogie carriage immediately behind the engine was swung out to the right and capsized down the bank, clear of the track, the Inter and Brake-van Bogie, second from the engine. crashed into the back of the tender, closely followed by the third carriage from the engine, a III Class Bogie, so that the second and third carriages partially telescoped. These were the only vehicles derailed and damaged.

4. According to tickets issued between Noakhali and Sonaimuri the train carried at the time of the accident, 2 first, 1 second, 2 inter and 58 third class passengers. The pass-holding passengers on the train were a Travelling Ticket Examiner, a Sub Permanent Way Inspector and a Railway Contractor. One passenger, Karim Bux, son of Akpan Ali, of Village Satarbya, District Noakhali, was severely injured and died next day, three passengers and a fireman (their homes are given in an Appendix) were less severely injured and several others were shaken and received minor injuries. The injured received prompt medical attention from a village dispensary which happened to be within 50 yards of the scene of the accident.

5. The track immediately before and behind the scene of the accident was found to be in good condition. At the actual site of the derailment it was, of course, much displaced and torn up, but all joints were holding. The accident occurred on a 2^0 curve turning left. At the point of the derailment the gauge was found 3 ft 3-5|8 in. and the superelevation $\frac{3}{4}$in. but the track for 250 feet *behind* the point of derailment was considerably distorted, presumably by lateral strains caused by the sudden stoppage of the train.

6. The accident occurred in broad daylight in clear weather.

Description of the Locality.

7. The track of the Noakhali Branch of the Assam Bengal Railway consists of 41½ lb. F. B. rails on wooden sleepers. Because of the lightness of the track, before the introduction of Y F Engines, F and G type Engines with maximum axle loads of about 8 tons only were used. The speed was restricted to 25 miles per hour.

8. Looking at the line in the direction in which 123 Up travelled, the line is straight from mile 94-1|9, the virtual grade from Sonaimuri, mile 95¾, is level, though the actual grade line contains a rise of 1 in 200 balanced by a fall of 1 in 200, each about ¼ mile long, on either approaches of girder bridges. The curve at which the derailment took place is the third from Sonaimuri station. All three curves are of 2865 foot radius, but the first curve is to the right, the second and third to the left. The straight between the second and third curves is nearly a mile long and contains ¼ mile of rise and ¼ mile of fall, of 1 in 200, the latter ending just near the entrance to the curve. The track is on bank which at the point of derailment was about three feet high.

Statement of Evidence Taken.

9. Many witnesses were examined and the evidence of sixteen recorded. The factors in the case are—

(*i*) The condition of the track.

(*ii*) The speed of the train, and

(*iii*) The condition of the rolling stock, particularly of the Engine which is accepted to have left the rails first.

10. The condition of the Engine was not questioned because it was new and the driver Alimuddin who drove it had had no trouble with it in the 20 days he had been driving it.

11. There is no evidence that the track was defective or had been in any way tampered with. There is also no evidence of an obstruction on the line. The Sub Permanent Way Inspector concerned, Chand Meah, 33, of 18 years service, who travelled by 123 Up on the 7th October 1929, stated that to his knowledge the track had not been touched at the spot for 8 or 9 days. The Gangmate, Ana Meah, 50, service 21 years, stated that he had started inspecting with the gang that morning from a telegraph post ahead of the point of derailment but found nothing wrong till telegraph post 93|7 where he put the gang on to picking up a slack. This was confirmed by Mahomed Idrish, 20, a student in a school 50 yards from the scene of the accident.

12. On the other hand there is direct evidence that the speed of the train was excessive. Four disinterested witnesses, two of whom rode in the train and the remaining two saw the train from the above mentioned school, declared that the speed of the train was excessive and the oscillation alarming. The two from the school were selected to give evidence out of many who were prepared to say the same thing. The Sub Permanent Way Inspector and the Gangmate also attested excessive speed. The driver, the fireman, the guard and the brakesman of 123 Up, however, declared that the train was travelling at its usual speed of about 22 or rather more miles per hour. They can scarcely be considered disinterested. One other witness, a Travelling Ticket Examiner, considered that down the last grade the train was travelling rather faster than usual, but the speed was not alarming. He had noticed, however, that since the introduction of Y F Engines carriages had rocked more than usual. The driver in his evidence stated that Y F Engines roll.

Conclusions.

13. The Committee of Enquiry found the cause of the accident in the excessive speed of the train and held Driver Alimuddin responsible for the accident. After going over all the evidence on the spot and after examining the site and the damaged rolling stock I agreed with the finding.

APPENDIX A.

List of Injured Persons.

Karim Bux, Village Satarbya, District Noakhali.	Died from severe injuries.
G. I. Chakrabarty, Village Pathain, P. O. Schipara, Tipparah.	Injured appreciably.
Fazal Haque, Village Gujuria, P. O. Nadauna.	Ditto.
Shama Charan Dey, Armaniantalla, Dacca.	Ditto.
Resan Ali, Fireman, A. B. Railway ..	Ditto.

8 others received minor bruises.

APPENDIX B.

List of damages.

	Rs.
Total amount of damages to Permanent Way ..	800
Total cost of repairs to Engine No. 180 Y F and tender	907
Total damages due to accident (including damages to Rolling Stock)	7,127

NORTH WESTERN RAILWAY.

56 DOWN PASSENGER RUNNING INTO A MOTOR LORRY AT MILE 30|1—2 BETWEEN BAHALIKE AND CHUHAR-KANA ON 10TH OCTOBER 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY RAILWAY BOARD, LETTER No. 115|29-1711, DATED THE 19TH NOVEMBER 1929.

In accordance with the Rule 7 of Railway Board's No. 120-T.-18, dated 21st March 1923, I submit herewith my report on the collision between 56 Down passenger and motor Bus, No. P.-3231—at level crossing mile 30|2 near Chuhar-kana on the Sangla Hill-Lahore section of the North-Western Railway.

2. A preliminary enquiry was held by the Multan Division on 12th October 1929, and the evidence recorded at it was accepted by me. I held an enquiry at Chuhar-kana on 15th October 1929 in the presence of—

G. W. Weares, Esq., Divisional Engineer, Multan.

S. Z. Shamsie, Esq., Divisional Transportation Officer, Multan.

I. S. Cameron, Esq., Divisional Rolling-Stock Officer, Multan.

Malik Ahmed Khan, Magistrate, Sheikhupura.

M. Ghulam Mohiuddin, Sub-Inspector, Railway Police, Lyallpur.

The site of the accident was visited the same day.

Description of the accident.

3. On 9th October 1929, while 56 Down passenger was approaching the down outer signal of Chuhar-kana it collided with Motor Bus, No. P.-3231 at an unmanned level crossing at mile 30|2, on the right bank of the Gugera Branch Upper Chenab Canal, on the Sangla Hill-Lahore section of the N.-W. Railway.

4. The bus had nearly cleared the track when the rear portion of it was struck by engine No. 1051|S. G. C. it was hurled into the canal, and is a total wreck. Of three persons on the Bus two went into the canal with it and were drowned, the third was pitched off and escaped unhurt. The body of one person has since been found.

5. The train proceeded for about 700 feet before it was stopped, no damage occurred to it or any railway works ; none of the passengers or staff were injured.

The train was running at about 35 to 40 miles per hour and the down outer-signal was off for its reception.

Description of the locality of the accident.

6. Approaching Chuhar-kana from Bahalike the track is straight upto mile 30|12 whence it swings to the right through a curve of 5,730 ft. radius up to mile 30|5—6 on an embankment 8 to 12 feet high. At mile 30|2 Kucha road converges at an unmanned level crossing ; between mile 30|2 and 30|1 the Gugera Branch is crossed by a 3—40 ft. plate girder deck bridge ; at mile 30|1 another kucha road is crossed at an unmanned level crossing, this road has an open gate some 200 ft. away on one side and another one about half a mile away on the other side, it has the usual conventional road signs some 250 ft. away on either side of the line. The former road is open to the public, the latter is reserved as an inspection road, both are canal roads.

The view from the footplate of the left approach of the lower road at the level crossing mile 30|2 is completely obscured by trees upto mile 30|7, beyond this intermittent views of the road can be obtained if a look out is kept. The right approach is completely obscured by trees until one almost reaches it.

The view of the approaches of the upper road at mile 30|2 and the one at mile 30|1 is partially obscured by trees.

The track is on rising grade of 1 in 400 upto mile 30|2—3, is level across the bridge from here to mile 29|23—30|1 and falls at 1 in 400 from the latter point.

7. The level crossing at mile 30|2 is at the junction of two kucha roads, an upper one on the canal bank some 2 ft. below the railway and a lower one 50 ft. away from the canal and some 8 ft. below the railway.

About 200 ft. from the railway the lower road converges towards the upper road on an up grade of 1 in 25 and merges into it at the same level 50 ft. from the track, after crossing the railway the lower road diverges from the upper road in a similar way.

The motor bus was on the lower road ; upto a point 275 ft. from the track along this road the view is completely obscured by trees, from here a view of the track on the right can be had at mile 30|4, it is then hidden but another view can be obtained at a point 194 ft. from the track and beyond this little can be seen. On the left of the road the track is hidden by the canal bank until within 250 ft. of it when intermittent views can be obtained through scattered trees.

The position as regards range of view from both road and rail for down trains is very unsatisfactory, for up trains it is better but can be improved.

The surface of the level crossing was in good order, only 20 ft. of it was level instead of the standard of 40 ft. ; the approaches are kucha and graded at 1 in 25, they were in fair order but should have been metalled ; it is rarely used by motors.

8. The collision occurred in broad daylight when it was fine and clear ; the plan attached gives all relevant information.

Conclusion.

9. Perusal of the evidence clearly shows Bus driver Jamal Din committed a rash and negligent act in attempting to cross ahead of the train and is primarily responsible for the accident, he has paid the penalty with his life, unfortunately his only passenger was also killed.

10. The question of improving the range of view at level crossings is once again forcibly brought out.

Had the engine driver been able to see the bus approaching he could at least have sounded a warning whistle and if necessary reduced speed when he realised the bus driver was doing a foolhardy act ; the trees, however, prevented such action being taken.

11. The attention of the Punjab Government should be drawn to the condition of the motor bus ; the hand brake was useless and the foot brake linings were worn. It is possible the bus driver had accelerated speed to surmount the grade upto the level crossing and was unable to pull up owing to the faulty condition of his brakes. Two other buses were examined at Chuhar-kana, on one the foot brake was useless and the hand brake not acting too well on the other the hand brake was useless and the foot brake linings worn. It was stated by the Magistrate that the inspection of motor vehicles is done by the Treasury Officer, Sheikhupura.

Recommendation.

12. I have already made recommendations as regards improving the range of view and of the introduction of adequate safeguards on road and rail and consider some action is called for.

13. The Punjab Government have issued a communique (copy attached) regarding the use of Canal roads by the public ; if these conditions did not exist when the level crossings at Canal roads were made their liability for providing suitable barriers and gatemen should be looked into.

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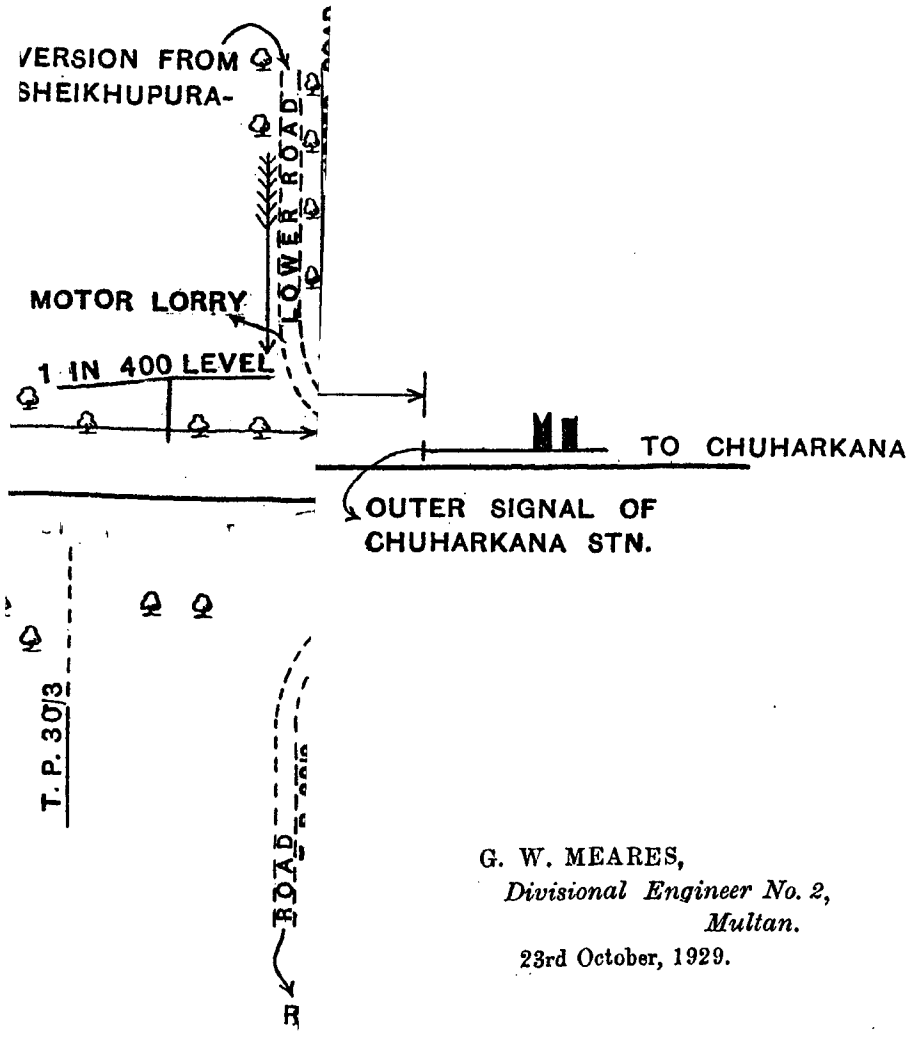
Si

CASE No. 483 T

DRAWING No. M—549 / 15-10-29 M. U. L.

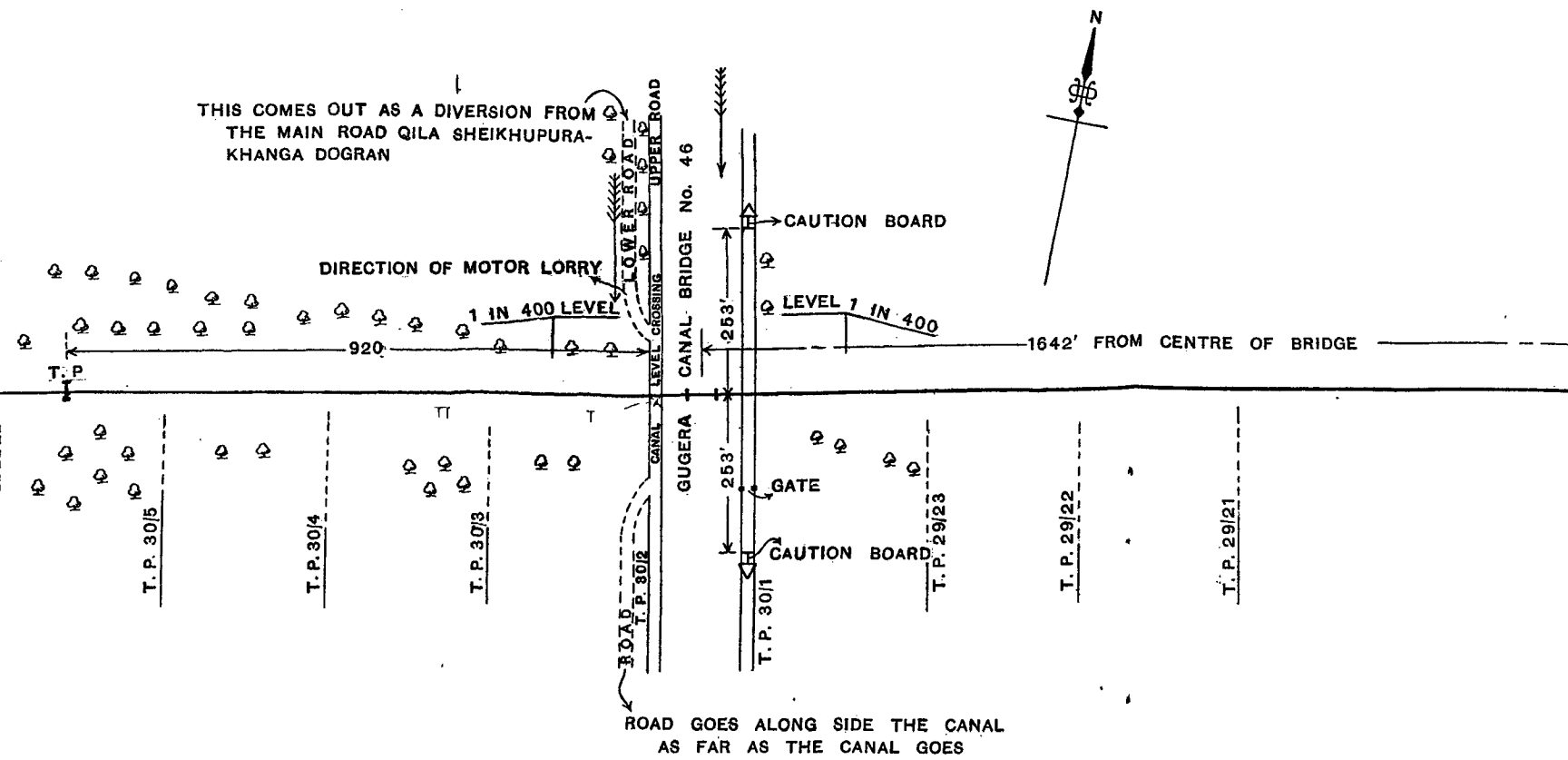


G. W. MEARES,
Divisional Engineer No. 2,
Multan.
23rd October, 1929.

Photo.-Zinco., July, 1930.—No. 434=550

PLAN SHOWING SITE OF ACCIDENT ON 10-10-29
AT CANAL LEVEL XING ON BRIDGE No. 46
AT MILE 30/1-2 BETWEEN BAHALIKE & CHUHARKANA STATIONS.

Scale–200' = 1".



BENGAL AND NORTH-WESTERN RAILWAY.

COLLISION BETWEEN 42 DOWN PASSENGER TRAIN AND A SHUNTING ENGINE AND RAKE OF WAGONS AT SAMASTIPUR STATION ON 23RD OCTOBER 1929.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 732-T., DATED THE 20TH DECEMBER 1929.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I beg to submit a report on the enquiry I held into the circumstances attending the collision of 42 Down B. & N. W. Railway Passenger train, when entering Samastipur yard on 23rd October 1929, with a shunting engine and rake of about 20 wagons.

2. I held the enquiry at Samastipur on November 6th. The District Officers were present. while I recorded all evidence.

Description of the Accident.

3. On the 23rd October at about 3.05 hours when 42 Down B. & N. W. Railway Passenger train from Darbhanga was entering Samastipur yard it collided head on with a shunting engine and rake of about 20 wagons which were shunting out on the same line.

The collision occurred on the turnout of the outermost facing points.

4. 42 Down Passenger was entering the yard at a low speed and the rake with which it collided was being moved at an ordinary shunting speed. The damage therefore was comparatively slight.

5. Nine of the passengers and engine crew were slightly injured, of whom only one passenger was injured at all seriously, he having fractured a bone in the nose.

6. Of the rolling stock, both locomotives were damaged but not derailed, two wagons next to the shunting engine were derailed and the next three capsized. The first three 6-wheelers of the passenger stock were derailed and the rear of the third coach was telescoped into the leading compartment of the fourth 6-wheeler.

7. All lines were blocked at the west end of Samastipur yard for 5 hours when they were cleared and normal working was resumed.

Site of the Accident.

8. The collision occurred on the outermost cross-over at the West end of Samastipur yard. The Muzaffarpur and Darbhanga branches enter the yard at this end, the former on a long straight, the latter on a curve terminating about 100 yards inside the outer signal from where it runs straight into the yard. The Outer and Home signals of the Darbhanga branch are visible from each other.

9. The situation as regards working trains into Samastipur from the Darbhanga branch on the night of the 22nd|23rd was that when signals were being lowered for the 250 Down Goods train from Darbhanga, the train preceding 42 Down on the section, the signal wire of the Home signal broke and both 250 Down and 42 Down were received with the signal out of order and at danger.

The Driver of 250 Down had no notice, of course, of this signal being out of order, whereas the Driver of 42 Down Passenger was given a memo. at Muktapur the last station. This memo. warned the Driver that his Home signal at Samastipur was out of order and that he " would work on Outer and Hand signals ".

Evidence.

10. The evidence, as is usual in such cases, is divided ; the engine staff stating that, in accordance with the memo. given to the driver at the last station, the outer signal was correctly lowered and hand signals displayed at the points for his reception into Samastipur. The Station Master and Traffic staff maintain that the outer signal was at danger and the driver of 42 Down should have stopped at that signal.

11. Taking first the Driver's case :—

(*i*) He had received a warning memo. when leaving Muktapur that his signal would be out of order and that he should work on the outer and hand signals.

(*ii*) The run from Muktapur to Samastipur is 2½ miles and would occupy about 6 minutes in his case. He could hardly have been asleep and must have been more or less on the alert, more especially as Samastipur is his terminal station, and there is no doubt that he slowed up his train and came in very cautiously.

(*iii*) The manner in which 250 Down Goods is reported to have been received by the Driver and Guard of the train support his theory that the outer was lowered to bring him on slowly and it was intended that the memo. to pass the home signal would be handed to him by the pointsman or Jamadar outside the points when he was coming in.

(*iv*) The memo. itself gives no warning that 42 Down would be stopped at the Outer and be piloted in, but, on a straightforward reading, indicates the intention that the train would be brought in on the lowered outer signal and hand signals.

12. The Traffic evidence after the accident is to the effect that the rules for working trains when signals are out of order were strictly observed, but there were admittedly irregularities and much haphazard working :—

(1) The Assistant Station Master sent instructions in the Line Register to the shunter at the trailing points warning him of the expected arrival of 42 Down on Line No. 4, but sent no such instructions to the shunter at the facing points.

(2) The Assistant Station Master denied any responsibility on his part to see that a line is clear for the reception of a train before giving orders for its reception on that line.

(3) The Assistant Station Master held the Traffic Shunter responsible for the clearing of the line for the reception of 42 Down, but gave him no proper instructions nor required any assurance from the shunter that the line was clear before he lowered signals for the train.

(4) Even in the case of the trailing end, the Line Register was sent out to the Traffic shunter to clear Line No. 4, but the Assistant Station Master stated that he did not wait for the return of the book before lowering signals, so that he admitted trains without knowing whether the line had been cleared or even whether his instructions had been received by the Traffic shunter.

(5) The Assistant Station Master considered the exchange of badges with the Jamadar as all that was required of him, though under Subsidiary Rule 247 (*k*) (*iii*) the Jamadar is only responsible for the correct setting of the points.

(6) An engine and rake of 20 wagons was being shunted out into the face of an incoming train without the Assistant Station Master's knowledge, and, with the system of working disclosed, this is always possible.

(7) The Traffic Shunter Rambalihari Singh, knew that Line Clear had been given for 42 Down and yet permitted the shunt to be made in the face of this train rather than out on to the Muzaffarpur line which was more accessible and was clear at the time. The shunter denied any responsibility on his part to see that his shunt was being performed with safety and acted up to this denial. He held the pointsman responsible and the pointsman knew nothing of the expected arrival of 42 Down.

(8) The Shunting Pilot Driver, instead of working under the orders of the Traffic Shunter, worked on signals from the pointsman.

(9) The Jamadars were permitted to change duty after 42 Down had left the last station and in fact must have been in sight.

Conclusion.

13. I cannot believe that the Driver deliberately ran against signals when he was obviously on the alert and approaching with caution, more especially as I have recently witnessed at another station a passenger train being halted only at the facing points and home signal, when signals were out of order.

14. I consider the accident was the result of very haphazard working on the part of the whole Traffic Staff at Samastipur and especially of the Assistant Station Master, Mr. Martin, who was on duty at the time.

15. In a very busy yard like Samastipur which is very much in need of extension and remodelling in the interests of safe and expeditious working special rules should be drawn up for working the yard which are complete and which apportion duties very carefully among the members of the staff, and it should be seen that these rules are very carefully obeyed.

Medical.

16. The Railway District Medical Officer, Samastipur, personally turned out very promptly to the scene of the accident and medical attention was given to the injured promptly.

NORTH WESTERN RAILWAY.

133 UP FRUIT SPECIAL RUNNING INTO A BULLOCK CART AT THE LEVEL CROSSING AT MILE 3|23 BETWEEN SUKKUR AND ARAIN ROAD ON 24TH OCTOBER 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 119|29-1792, DATED THE 30TH NOVEMBER 1929.

In accordance with Rule 7 of Railway Board's No. 120-T.-18, dated 21st March 1923, I submit my report on the accident which occurred on 24th October 1929, at a manned level crossing at miles 3|23 on the Rohri-Ruk section of the North-Western Railway.

2. A preliminary enquiry was held by the Karachi Division on 7th November 1929 the proceedings of which were accepted by me.

I held an enquiry at Sukkur on 8th November 1929 in the presence of—

R. Hatt-Cook, Esq., Divisional Engineer, Karachi.

S. E. L. West, Esq., Divisional Commercial Officer, Karachi.

H. Brown, Esq., Divisional-Rolling Stock Officer, Karachi.

The site of the accident was visited the same day.

Description of the accident.

3. On 24th October 1929, about 13—50 hours shortly after 133 Up Fruit Special had left Sukkur station it collided with a bullock cart at a manned level crossing at mile 3|23 on the Rohri-Ruk section resulting in the wrecking of the cart, the death of the cartman and a bullock and serious injuries to a child riding on the cart.

4. No damage was done to the railway or the staff.

The train was running at high speed and stopped after going a distance of 208 ft.

The injured child was picked up and taken on the train to Ruk for medical treatment and subsequently moved to Sukkur where he is progressing satisfactorily.

The weather was fine and clear.

Description of the locality of the accident.

5. Approaching by rail from Sukkur the road from Sukkur to the level crossing is clearly visible, that from Shikarpur is completely obscured by the gatehut which is 12-ft. 6-inch. above rail level.

From the Ruk direction the view of both approaches is obscured by the masonry piers and abutments of the Lloyd Barrage railway.

The track is straight and level on both sides of the crossing.

6. Approaching by road from Sukkur it runs parallel to and alongside the railway for about 100 yards and is level ; persons on this road can only get an occasional view of trains from Ruk owing to bushes near the track and to the massive piers of the Lloyd Barrage railway coming in the way ; having their backs towards Sukkur it might not strike people to look back for trains.

Approaching by road from Shikarpur which is on a straight grade of 1 in 150 the view towards Sukkur is completely obscured by the gate lodge ; as the road runs parallel to and alongside the railway it might not strike people to look back for trains from Ruk, the view too is poor owing to the piers of the Lloyd Barrage Railway being in the way.

7. The crossing has 9 ft. double leaved gates on each side, working independently of each other ; one leaf on each side swings outwards at right angles, the other ones have to swing outwards through 180 degree before the road is cleared.

The gate lodge is a double unit for the two gatemen on the crossing and close to the track.

The crossing and its approaches were in good order.

8. A census of road traffic gave the following results per 24 hours, approximately half the traffic moves by day and the remainder by night.

Motor vehicles	94
Cart and Tongas	1,027
Animals	791
Men	841

The road at the crossing is one of the main arteries of traffic to and from the town and the incidence of road user is very high.

9. There are no conventional road signs on the road and no warnings on the track.

The maximum speed on this section is 35 miles per hour ; the following number of trains were running daily.

Passenger trains	16	Fast traffic.
Fruit trains	2	
Goods trains	6	
Total ..	24	

10. There are " A " class level crossings at mile 2|10-11 3|4 and 3|23 and a bridge used as a subway with limited headway at mile 3|4-5.

Conclusions.

11. The evidence discloses what happened and how the accident occurred.

Gateman Nihal fell ill about 19th October 1929 and asked for leave but was told by S. W. I. Prem Chand to carry on as there was much sickness among the gangmen and a man could not be spared to relieve him. He had a relative Godah living with him whose aid he enlisted, at the same time teaching him the work.

He was unable to do any work on 1st October 1929 and after installing Godah as his relief he went home ; Nihal is guilty of a breach of General Rule 181 and 235 and Subsidiary Rule 235|1.

On 22nd October Godah was examined by S. W. I. Prem Chand and enrolled as a gateman in place of Nihal ; I disbelieve his (Prem Chand's) evidence as to Nihal being present on 22nd October as the evidence of Gateman Miskin and octroi clerk Latif Ali Shah clearly shows Nihal left on the afternoon of 21st October. In the muster roll of October he has shown Nihal " S " (Sick) from 19th to 21st October.

12. I consider S. W. I. Prem Chand should be severely punished for—

(*a*) Not relieving Nihal earlier when the man was unable to do his work. His reason that the gangs were depleted owing to illness is a poor one, during fair weather the further depletion of the gangs would not have imperilled the safety of trains whereas an important level crossing should have had a competent man.

(*b*) Appointing Godah, gateman at such a crossing without any previous experience on railways.

(*c*) Making a false statement about Nihal being present on 22nd October.

(*d*) Not reporting to his P. W. I. either about Nihal leaving without permission or about appointing Godah in his place.

13. The evidence of Gateman Godah that he tried to prevent cartman Sadik (deceased) from coming on to the track is supported by octroi Munshi Latif Ali Shah and Boy Mahomed Usman (son of Sadik) and Sadik must therefore be held primarily responsible for comitting a rash and negligent act in attempting to cross the track when he was told not to—he has paid the penality with his death ; his son though seriously injured had a miraculous escape.

14. The gateman has warning of trains approaching Sukkur by the outer signal being off, he has no means of telling when a train has left Sukkur. If gateman Godah had previous railway experience he might have had the presence of mind to exhibit danger signals to the train instead of trying to arrest the progress of the cart when he found a collision between the two was imminent.

The engine driver's view of the Shikarpur approach to the crossing being completely hidden by the gate lodge no blame can attach to him.

NORTH WESTERN RAILWAY.

'32 DOWN PASSENGER RUNNING INTO A BULLOCK CART AT LEVEL CROSSING NO. 32, AT MILE 33|14 BETWEEN CHAK AND SHUJABAD ON 28TH OCTOBER 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 122|29-1833, DATED THE 7TH DECEMBER 1929.

In accordance with Rule 7 of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit my report on the collision which occurred on 28th October 1929 at a manned level crossing at mile 33|14 between 32 Down Passenger and a bullock cart on the Khanewal Lodhran (loop) section of the North Western Railway.

2. A preliminary enquiry was held by officers of the Multan Division on 2nd November 1929, the evidence recorded at it was accepted by me.

I held an enquiry at Shujabad on 9th November 1929, in the presence of :—

E. G. Townshend, Esq., Divisional Rolling Stock Officer, Multan.

S. Z. Shamsie, Esq., Divisional Transportation Officer, Multan.

M. R. Dhand, Esq., Divisional Engineer, Multan.

The site of the accident was visited the same day.

Description of the Accident.

3. On 28th October 1929 at about midnight, shortly after 32 Down Passenger had left Chak station, the engine No. 2359-S. G.|S. collided with a bullock cart at a manned level crossing No. 82 at mile 33|14, close to the up outer signal on the Khanewal Lodhran (loop) section of the North Western Railway.

The cart was thrown off the track to a distance of some 80 ft. and partly damaged, the cart driver and another person on it and a bullock being killed outright.

No damage occurred to the Railway nor were any passengers or staff hurt.

4. No report was made by the engine driver or Guard of the train of the accident.

The weather was fine and clear, and the engine searchlight was brilliantly alight.

Description of the Locality of the Accident.

5. Approaching by train from Chak a clear view of the level crossing is obtainable from mile 34 ; the gates which are 12 ft. long and painted white open inwards towards the track and stand out prominently. The view of the Shujabad approach is obscured by some trees and the approach can be seen from mile 33|19 ; that of the Multan approach is also obscured by trees and this approach is not visible till mile 33|16.

Approaching by train from Shujabad the level crossing is visible from mile 33|4 ; the Shujabad approach is more or less open from the same spot, but the Multan approach is practically hidden by trees and the gate lodge. Tests on these points were made from an engine footplate.

6. Approaching by road from Shujabad down trains can be seen fairly well but are somewhat obscured by trees ; up trains can be clearly seen but cart drivers have their backs to them owing to the road being nearly parallel to the line.

Approaching by road from Multan down trains cannot be seen at all well owing to trees being in the way ; up trains are practically obscured by trees and the gate lodge.

The road approaches are Kucha and are graded at 1 in 20 up to the line ; they were in fair order. The crossing is surfaced with fine screenings of brick and was in good order. The crossing is manned by one gateman, is normally closed at night and has no lights for use.

Conclusion.

7. As the cartman was killed and the Engine Driver denies all knowledge of the occurance there is no direct evidence of what actually occurred, but one can draw reasonable conclusions from the evidence.

Gateman Yar Mohomed has put forward a plausible story about being ill for days but the evidence of Mate Allah Bux and Key man Fateh Mohammed both of whom saw him on 28th October 1929, disproves this ; Permanent Way Inspector Ralla Ram saw him on 26th October 1929, when he was well. The gateman was examined by the Sub-Assistant-Surgeon from Multan on 29th October 1929 and found to be well and did not have the appearance of having being ill. He admits not having padlocked the gates on 28th October 1929, and his excuse for not having done so owing to illness must be rejected. He is guilty of a breach of General Rule 229 (*b*). Apparently this was a regular habit of his as Cartman Kadir Bux refers to it in his evidence and there is no reason why he should not be believed.

8. A census at the level crossing of road traffic shows that it is used daily by :—

Motors	3	Half by day and night respectively.
Other vehicles	4	
Animals	338	Two thirds by day balance at night.
Men	234	

9. There are ten passenger trains and two goods trains running daily on the section. The road traffic is not heavy but owing to the fact that it moves throughout the 24 hours, the gateman does not get adequate rest and it is this that probably led to his not padlocking the gates at night. He cannot refuse to pass the traffic and his position is not an easy one. He was a very nervous witness and the general impression he gave was that of a tired man.

10. Engine driver, Budha, was a very unsatisfactory witness and made misstatements in a most brazen way. He began by declaring he could only see three rail lengths ahead with the electric head light full on. When the absurdity of this was pointed out, he gradually admitted to more and more and ultimately declared he could clearly see from the outer up to the home signal. One could corner him about his range of view as one only had to have him medically examined (he was last examined for night vision on 1st December 1928), but he realised the seriousness of his position as regards not having seen, felt or heard the collision with the cart as declared by him.

The gates open inwards and stand out prominently and if he did not see them he should have done so. Search lights have been fitted expressly for the purpose of improving visibility at night and it is incumbent on drivers to take advantage of the facilities afforded. He admits being on the look out at the time and I disbelieve his statement about not seeing the gates. His contention that while passing over the level crossing more noise is created than normally on the open track is not borne out by facts as conditions are just the reverse, especially at an unmetalled crossing like this where a decided deadening of sound occurs ; this rules out his story of not having heard anything.

It is quite possible for him not to have felt anything, though this is highly improbable when striking such a solid mass as a bullock and cart.

11. For similar reasons I descredit the story of the firemen that they knew nothing of the accident.

12. Examination of the broken wheel of the cart and damaged iron tyre showed clearly that the cart must have been caught almost in the centre I am of opinion engine driver Budha did see the cart but reckoned on its getting across in time ; and this, coupled with the fact that the gates were wide open and clearly visible, constitutes rash and negligent driving on his part ; he is guilty of a breach of section 101 of the Railway Act. He has a fairly good record and is in a special grade.

13. Cart driver Kadir Bux declares the gates were open, as he was asleep on his cart and the bullocks took it across. Even if he opened them, he got across unscathed and in the eye of the Law has committed no offence.

14. Cartman Allah Bux (deceased) was also asleep according to Kadir Bux, apparently he observed no caution and must be held to blame for his action in not keeping a look out, he has paid the penalty with his life but unfortunately his only passenger was also killed.

15. The accident was reported to the Station Master, Shujabad early on 29th October 1929, who issued a joint message about it at once and it is much to be regretted no action was taken by anyone to have the engine examined at Khanpur when it went into the runing shed. It was not examined till 30th October 1929 when it got to Khanewal and no marks were then visible on the cowcatcher. The indentations on the iron tyre of the cart must have left some marks on it.

Recommendations.

16. The traffic at this crossing does not warrant a second gateman but owing to the fact that some of it moves at night the gateman cannot be expected to do 24 hours duty. The gates might be permanently locked at night for 8 hours and the civil authorities advised.

17. The gates should have proper lights fixed on them for use at night.

EAST INDIAN RAILWAY.

7 UP EXPRESS RUNNING INTO A MOTOR LORRY AT LEVEL-CROSSING NO. 51, MILE 752|18, NEAR SHIKOHABAD STATION ON 14TH NOVEMBER 1929.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, (THROUGH MR. H. LAWTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA), TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 682-T., DATED THE 10TH DECEMBER 1929.

As required by paragraph 7 of Railway Board's Notification No. 120-T.-18, dated 21st March 1923, I submit a report of the enquiry I held into the causes and results of the above accident on November 28th at Shikohabad.

2. There were present at the enquiry—

H. R. Roe, Esq., Assistant Inspector-General, Railway Police, U. P.

E. Rodgers, Esq., Superintendent, Railway Police, "A" Section, Agra.

E. R. Casement, Esq., Senior Superintendent, Way and Works, E. I. Railway, Allahabad.

E. W. Lloyd, Esq., Superintendent Power, E. I. Railway, Allahabad.

E. H. Jacobson, Esq., Superintendent Transportation, E. I. Railway, Allahabad.

H. Sri Navas, Esq., Sub-Divisional Magistrate, Shikohabad.

Description of the Accident.

3. On the 14th November 1929, about mid-day No. 7 Up Express, E. I. Railway entering Shikohabad yard, struck a motor lorry at level-crossing No. 51, mile 752|18 situated 271 feet from the Home signals. The lorry was struck by the buffer of the engine on its leading wheels, swung round till the body struck the footplate of the engine, and the whole lorry was flung about 40 feet on and 10 feet from the rails and partly overturned. The bank here is double and so the lorry was not off the bank.

4. There were 12 passengers and a driver in the lorry, of these 4 were killed and 7 severely injured and 2 less severely injured. Of the 7 seriously injured 3 have been subsequently discharged from hospital and 4 are still receiving medical attention but are expected to live except possibly the driver.

Description of the Locality of the Accident.

5. The accident occurred at Mile 752|18, 271 feet outside the Up Home Signal of Shikohabad station, E. I. Railway Main Line.

6. The Up approach of trains to Shikohabad is round a flat ½ degree curve which terminates about 400 feet short of the level crossing. There is a low cutting about 1,000 feet from the level crossing and a good deal of tall grass growing on the bank which partially obscures the view of the level-crossing from the driver. The gateman should see an approaching train by day-light when about 1,200 feet from his lodge.

7. The level-crossing is of a pucca road in exceedingly bad condition within railway limits, with large deep pot holes, and is very thickly covered with dust. It is the main road from Shikohabad town to Bateshwar and on the day of the accident, and for a day or two before and after, a large and important fair was being held at Bateshwar.

The road was therefore continuously and fully occupied by lorries, carts, ekkas, cattle and foot passengers and there was generally a cloud of dust partially obscuring the view of both the driver and the gateman.

8. The gate is manned by two railway gatemen, and in past years at the time of the fair the District Police have usually appointed two constables to help to regulate the traffic at this gate. This year due to shortness of personnel only one constable was appointed and he, after being on duty all the morning, had just gone off to have his mid-day meal.

9. The gates are not connected with running signals and not coupled with each other and are not very well maintained as regards their hang, as unless carefully bolted they swing open of themselves. The locks are not attached to the gate by a chain as is usual, but are separate and are usually retained by the gateman in his pocket or lodge when the gates are open to road traffic.

10. The weather was clear but there was reported to be a considerable dust haze over the road crossing.

The Evidence.

11. The only evidence available as to the circumstances attending the accident is contained in the statements of the Driver, the Gateman and one of the injured passengers of the motor lorry. The Railway servants and especially Mr. Wilson, Commercial Traffic Inspector were, in my opinion, extremely remiss in not questioning the large number of public eye-witness that must have seen the accident occur. Mr. Wilson wasted a good deal of time in taking the names of the Guard and Driver and the number of the engine and in other useless ways when it was his duty to collect information, especially outside evidence, in a case in which the Railway were likely to be involved in the matter of payment of compensation, which I understand is his own particular affair.

12. The Driver's statement I consider very largely untrue. He had his signals and trusted that the road gates would be right for him. He would very correctly be standing on the left of his cab at the vacuum brake handle ready to manipulate the brakes to pull up at Shikohabad station where he was timed to halt. With the dust raised by the road traffic he saw little, but when he heard the crash of the accident he immediately applied his brakes and promptly brought his train to a stand. His statement that he applied his emergency brakes twice is not borne out by the Guard.

13. The injured lorry passenger gave a straightforward statement but saw little and, after his experience, can be expected to remember very little of the incidents immediately preceding the accident.

14. The Gateman gave a simple, plain and in my opinion, perfectly truthful statement, and I am supported in this view by the opinion of the Magistrate who was present at the enquiry.

15. There is no doubt the man was present, and so saw the signals lowered for the train ; and there is therefore every reason to believe that knowing the speed of the train and the short interval he would have before the train arrived he endeavoured to close the gates and carry out his duties. I believe he closed and bolted the right hand gate and then went on to clear the roadway and close the left hand gate. Meanwhile some pedestrian unbolted the right hand gate and got across following the gateman. The gate swung open on its hinges as it does, and the Lorry Driver seeing it open went forward as stated by the gateman.

16. I have grave doubts as to whether the gateman even intended to lock the gates or even had the locks with him. The locks might have been in the gate lodge and the man proposed only to bolt the gates.

Conclusions.

17. I am of opinion that the gateman closed and bolted the right hand gate and then occupied himself in clearing the road and then went to close the left hand gate. Meanwhile some pedestrian opened the right hand gate which swung open of itself and the Lorry Driver seeing the gate open went forward and was struck by the engine of 7 Up Express just as his front wheels were over the rail nearest him.

18. There would have been no accident had the gateman locked the right hand gate when he says, and I believe, he closed and bolted it. He is to blame to this extent therefore for the accident and he is being prosecuted under section 101 of the Railway Act.

19. As mitigating circumstances I consider he had—

(*i*) The difficulty of controlling alone the heavy road traffic that was passing at the time.

(*ii*) The fact that the lock was not fixed to the bolt of the gate as is usual and therefore handy.

(*iii*) The fact that if an unruly pedestrian opened the bolt and left it open the gate swung open of itself.

Remarks.

20. I consider that at such mela times which are well known and at such level crossings with the gates not coupled the gate should have been double manned ; though more efficient still would be for the Railway, instead of paying for these extra men, to ask the local police to provide two constables at the crossing and accept debit for the constables salaries for the period they were required, 5 or 6 days. A constable in uniform would have more authority with the crowd.

21. Further I am of opinion that the time has come for gates at all such busy crossings to be coupled and provided not only with gate lamps at night but some corresponding form of semaphore arm for the day to indicate to the driver that the gates are open to the road and against him.

Disposal of killed and injured.

22. Prompt and, in the circumstances, the most suitable action seems to have been taken as regards the killed and injured.

The dead bodies of the 4 killed were made over to the Railway Police Shikohabad for identification and disposal. The 9 injured were rendered very elementary first aid by the Permanent-Way Inspector's Clerk who seemed to be the only man present who had been trained in first aid. They were then placed in two empty Intermediate compartments of 7 Up and sent on to Tundla. The District Medical Officer, E. I. Railway, was telegraphed to warning him of the expected arrival and he met them, took them over to the E. I. Railway Hospital and has there treated them.

23. It is worthy of note, however, that Shikohabad a junction station and 7 Up Express an important train had no first aid boxes as required by Railway Board in their letter No. 2673-T., dated 11th October 1928, even though all this time has elapsed since the orders were issued to provide these boxes.

ASSAM BENGAL RAILWAY.

154 DOWN MIXED TRAIN RUNNING INTO A PRIVATE MOTOR CAR AT MILE 467|11 BETWEEN KHUMTAI AND HAUTLEY STATIONS ON 7TH DECEMBER 1929.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, NO. 400, DATED THE 17TH APRIL 1930.

As required by the Rules for reporting accidents promulgated under Notification No. 1926-T., dated 19th March 1930, I have the honour to report on the above accident.

2. The accident was enquired into by a Committee composed of—

Mr. W. C. Blake, District Traffic Superintendent, Lumding.

Mr. A. H. Khan, Assistant Loco. Superintendent, Lumding.

The Engineering representative was unable to be present.

The following also attended the enquiry :—

Mr. J. H. Crace, Superintendent of Railway Police, for part of the proceedings.

Mr. N. C. Chowdhury, Sub-Inspector of Police, for the whole of the proceedings.

3. The proceedings of the above enquiry, together with a copy of the remarks of the Agent, Assam Bengal Railway on the finding, were received in my office on the 20th January 1930 and I took the first opportunity, which occurred on the 4th February 1930, to visit and inspect the site. I was accompanied on this inspection by the District Traffic Superintendent, Lumding, and the District Engineer, Mariani.

Description of the Accident.

4. At 19-30 hours on the 7th December 1929, Mixed Train No. 154 Down, composed of F. Class Engine, No. 34, running tender leading—

B. and N.-W. Railway I. C. G. wagon No. 4291, empty

E. B. Railway I. C. G. wagon No. 3057

Bogie composite No. 6004

Bogie Third No. 6090

Bogie Third No. 3753

Bogie Postal van No. 1230

Brake van No. 584

collided with a private Motor Car at mile 467|11 between Khumtai and Hautley stations on the Furkating-Badulipara-Jorhat Branch. The car was a 1927 model Chevrolet, owned and driven by Mr. R. F. Stephen, Manager of Khumtai Tea Estate, who was accompanied by his wife.

5. The engine of the train, which was approaching from the right side of the car, struck the left forward extremity of the chassis and swung the car round, through an angle of about 140 degree, in an anticlockwise direction, breaking the steering wheel, the bonnet, the left side of the windscreen and the front glass of the left head-light, crumpling up the left forward mudguard and the radiator and bending other portions of the car on the left side, without damaging the body of the car. Mrs. Stephen, who was on the left of the car, sustained severe shock and serious injuries, Mr. Stephen received only slight injuries.

6. The train was non-vacuum braked, because the foreign vehicles next to the Engine were not vacuum fitted ; but the engine had 20 inch

of vacuum and its load was only 132 tons 14 cwt., against a permissible load of 493 tons.

7. The night was dark, the weather was clear. High power head-lights were not in use on this Branch and there was none on the tender, but the usual head and side lights were carried.

Description of the Locality.

8. The Furkating-Badulipara-Jorhat Branch was opened to traffic in 1928. It carries 4 trains a day each way and the sanctioned speed is 15 miles an hour. The line is unfenced. The level crossing where the accident occurred is 2¼ miles from Khumtai, on the Furgating side. When approaching it, 154 Down was travelling S. S. E., on a falling grade of 1 in 500 followed by level, along a straight, unballasted track, the car on the other hand was rising from a depression 8 feet (at a distance of 120 feet from the level crossing) below the level of the rails and going W. N. W., the angle of the level crossing being about 40 degrees. The Railway track is straight for 1|3 mile before the level crossing, the road is somewhat winding, though its general direction follows an irregular curve to the left, and is so low from 400 feet back that no view of the track by a driver of a touring car can be obtained until within 20 feet of the rails. The level crossing is in effect in a shallow cutting, on the sides of which, at the time of the accident, there was a growth of waist-high grass.

Evidence.

9. The train and the car approached each other at an angle of 140 degree. The car was on the left side of the train, the train on the right side of the car. The engine was running tender first and as the driver was standing in his usual place, but looking in the direction of travel, he was on the side of approach of the car. He had been driving on the branch for 15 months and know the road well. The driver stated that he was running tender foremost, non-vacuum coupled at 15 miles per hour and had steam open when approaching the level crossing. There was a full vacuum of 20 inch on his engine and his brakes were in perfect order ; he whistled before approaching the level crossings, as he always did, because there are 3 or 4 level crossings about here, but did not see or hear any indication of the approach of a motor car until, just before he struck it, the head-lights of the motor car shone across the track. He stopped his train in rather more than its length. This was confirmed by the Guard of 154 Down who also stated that the train was 31 minutes late.

10. Mr. Stephen was driving his car on the 7th December 1929 at about 15 miles per hour with his head-lights on. It was about 8-15 P.M. local time. He had often driven across the level crossing and knew it well. He did not stop before going over the level crossing on that occasion because he thought the train had already passed. He was driving cautiously and was partly up the slope of the level crossing when the train appeared without warning. His wife exclaimed, " My God, there is the train ", he jammed on the brakes, but the car apparently skidded slightly over to the right and though he thought he had stopped in time to avoid an accident he had apparently gone a few inches too far. His brakes were in good order having been relined recently or he would not have saved a fatal smash. The train approached almost noiselessly and did not whistle and he considered that the driver was coasting down the grade with steam shut off.

NOTE.—The driver could not coast on a 1 in 500 down grade unless he had been going at excessive speed before. The train would travel with little noise over this earth packed track. The fact that the engine was tender foremost might have reduced the sound of its approach.

11. A good deal of the remainder of the evidence is directed towards proving that MR. Stephen was under the influence of liquor and (or as an

alternative) that Mrs. Stephen was driving. I consider that this evidence displays want of understanding if it is not wholly irrelevant and I reject it completely. There is nothing in the accident indicating either recklessness or inexperience on the part of the driver of the car and nothing in Mr. Stephen's behaviour after the accident that was abnormal.

Conclusion.

12. The level crossing is a blind one, both to the road and to the Railway and is wholly unprotected. Unprotected level crossings are usual in Assam where roads have very little traffic and Railway trains in many parts are slow and infrequent. The road in this case is a Tea Garden road carrying only very occasional motor traffic. It is in the Estate of the Tea Company one of whose gardens is managed by Mr. Stephen and he had often used it and was thoroughly familiar with it. The Tea Garden authorities took no steps themselves to remedy and apparently had not made any complaint about the blindness of the road approaches to the Railway authorities. Probably no Railway officer had approached the level crossing from the road since trains first began to run on the line and thus the blindness of the level crossing within their land escaped the notice of the Railway. Circumstances combined against Mr. Stephen that 7th December night, as it might have been expected that sooner or later they would. The train was 31 minutes late. Mr. Stephen did not know this and thought it had gone. He consequently did not exercise the caution he might have exercised had he *known* the train was due. He arrived at the level crossing at the same moment as the train, not hearing it at all and not seeing it until too late. Had he been half a minute earlier or later the accident could have been avoided. It was a pure accident due to the coincident arrival of a train and a motor car at an unguarded level crossing and I cannot hold that blame is attachable to anybody in particular. The blind level crossing should not have existed and it was in the power of the Road owners to improve visibility on the approaches in their portion and to have asked the Railway to do their share.

13. Steps must be taken to avoid similar accidents at this level crossing (and other like level crossings) in future. Consequently in my letter No. 155, dated 11th February 1930 to the Agent, Assam Bengal Railway, I ordered that—

(*i*) four white posts should be put up to mark the position of the level crossing.

(*ii*) the road should be made level for 15 feet outside the posts and graded not steeper than 1 in 30 beyond.

(*iii*) High power headlights must be fitted to Engines, so as to throw a beam ahead of the train whether Engines run tender leading or trailing.

14. Jungle obscuring visibility at level crossing should be keut down by the railway and road authorities each in their own sections.

NORTH WESTERN RAILWAY.

ACCIDENT TO 15 UP EXPRESS AT AN UNMANNED LEVEL CROSSING (MILE 350/6) BETWEEN SAMARGOPALPUR AND KARAINTHI ON THE DELHI-BHATINDA SECTION ON 26TH DECEMBER 1929.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, NO. 2-T., DATED THE 20TH FEBRUARY 1930.

With reference to Rule 7 of Railway Board's Notification No. 120-T-18, dated 21st March 1923, I beg to forward my report on the derailment of 15 up Express on 26th December 1929 at mile 350/6 on the Delhi-Bhatinda section of the North Western Railway.

2. An Assistant officers' enquiry was held on 1st January 1930, the proceedings of which reached me on 4th January 1930. As I was unable to accept the finding in toto I decided to hold an enquiry myself.

3. I held an enquiry at Rohtak on 10th January 1930 in the presence of—

E. L. Manico, Esq.	..	Divisional Rolling-Stock Officer, Delhi.
V. L. Dean, Esq.	..	Divisional Transportation Officer, Delhi.
J. W. Bennett, Esq.	..	Divisional Engineer, Delhi.
Mohomed Anwar Khan, Esq.		Railway Magistrate, Rohtak.
Mr Nand Lall ..	..	Sub-Inspector Railway. Police, Jind.

The site of the accident was visited the same day.

Description of the Accident.

4. 15 Up Express collided with an abandoned bullock cart loaded with loose bones and hides at an unmanned level crossing, on the left bank of the Kahnaur Branch of the Western Jumna Canal, about 23-40 hours on 26th December 1929 at mile 350/6 on the Delhi-Bhatinda section of the North Western Railway.

The engine No. 2982/SP/S apparently carried the cart on the cowcatcher across the 2-12′ girder bridge spanning the canal for some 70 ft ; parts of the cart must have been hanging below rail level for they came into contact with the level crossing on the right bank and the cart was wrecked. The wreckage got under the leading wheels and derailed them 100 ft. away from the original point of the collision, the engine finally coming to rest 386 ft. further on.

The right hand derailed wheel of the engine ran over the sleepers some four to six inches from the foot of the rail, the left hand wheel was just clear of the rail and bent the fish plate flanges which had been reversed.

5. The train controller at Delhi advised Jind that the relief train was required and the message was delivered to the Loco Foreman at 0-50 hours, the train did not leave Jind till 2-15 hours and when it arrived at the site of the accident the engine had been nearly rerailed by the driver ; the job was completed at 4/5 hours on 27th December 1929.

6. The cart loaded with bones was drawn by three bullocks one of which is said to have shied, this resulted in one wheel leaving the road and being drawn for some 25 ft. along the side slope ; it mounted one rail but stuck against the other and could not be shifted. The cart driver unyoked the bullocks when he saw the train approaching and made off with them, abandoning the car on the level crossing.

7. The train was composed of nine bogie coaches and one four wheeler weighing some 345 tons excluding the engine.

Description of the Locality of the Accident.

8. Approaching from Delhi the track is straight for a considerable distance on an up grade of 1 in 1000 and on an embankment 6-8 ft. high ; the view of the north approach to both level crossings is fairly open, the south approach is more or less obscured by trees ; approaching from Jind the conditions are much the same.

9. Approaching by road from the north the view along the track both ways is fairly open, from the south the view both ways is more or less obscured by trees ; the level crossing is partially metalled and in good order.

Conclusions.

10. The evidence of Munshi (owner of cart), Kishna and Qadir Bux, residents of Chandi village, establishes the fact that instead of proceeding from their village by the usual track and crossing the line at the level crossing at mile 350-19-20, they deliberately got on to the canal road, owing to the former being in bad condition after rain, and under cover of darkness trusted to not being caught using it—they were aware of the fact that they are not allowed to use it—they had done this on previous occasions and had not been caught.

The cart stuck on the track some fifteen minutes before the train reached the spot and they endeavoured to get it away by unloading and reducing the load from 15 to 8 maunds. Having failed to move it and seeing the searchlight of a train in the distance they unyoked the bullocks and made off, abandoning the cart on the crossing.

11. I discredit the story of Munshi and Qadir Bux that Kishna was sent to Samar Gopalpur to advise the station master of the occurrence, they must have known Karainthi was much closer and that he would have got there sooner.

They had a light on the cart and if common sense had been displayed by any of them, one man should have run towards the approaching train moving the light or his arms to attract the driver's attention.

Though they had no malicious intent, I consider they have endangered the safety of trains by wanton neglect and have omitted to do what they were legally bound to do ; I consider they are culpable under sections 128 and 129 of the Railway Act.

12. Driver Harris states he was running at 50 miles per hour ; the train message books at Samar Gopalpur and Karainthi and the train control chart at Delhi show that the train ran through Samar Gopalpur at 23-33 hours,—Guard Eduljee gives it as 23-35 hours ; the accident occurred $2\frac{1}{2}$ miles away and the time of its occurrence as recorded by guard Eduljee and driver Harris is 23-41 hours. Putting aside the difference of 2 minutes in the timings it appears from Guard Eduljee's journal that 6 minutes were spent in the run of $2\frac{1}{2}$ miles which, allowing for the stop, gives a speed of about 30 miles per hour ; Guard Eduljee records that Driver Harris lost 4 minutes on the run from Rohtak to Samar Gopalpur, $6\frac{1}{4}$ miles, taking 13 minutes instead of the scheduled time of 9 minutes ; he also states that Driver Harris would have lost time between Samargopalpur and Karainthi at the speed he was running at. Allowing a couple of minutes for him to get under way from Rohtak and accepting Guard Eduljee's figures in his journal, which he had no motive in entering up otherwise than correctly, I consider that Driver Harris's speed at the time of the accident was about 35 miles per hour and his version of it as being 50 miles per hour must be rejected.

13. The station diaries at Rohtak and Karainthi show that the weather was fair about midnight of 26th December 1929, that at Samar Gopalpur shows it was cloudy ; Guards Eduljee and Uttam Chand and Sub-Way-Inspector Kishori Lall state that it was fine and dark, Guard Eduljee and Uttam Chand state that they could clearly see the outer signals of Karainthi $1\frac{1}{4}$ mile away, and those at Samar Gopalpur 2 miles away faintly ; Guard Harris states that he could see the former faintly.

It is a well known fact that in these arid tracts mist does not occur before the early hours of the morning even when rain has fallen recently.

Fireman Nathu states that it was cloudy and foggy, conditions that do not occur together ; Driver Harris states that it was misty. In face of the facts cited above the statements of both as to mist must be rejected.

14. Driver Harris states that his view was obscured by steam from the turbo-generator blowing across the cab window. The exhaust pipe is on a level with the top of the cab pointing backwards and with the wind in certain directions momentory blurring of a Driver's view might occur; it is scarcely sufficient to affect the view.

Driver Harris states that he got a view of something on the track from 150 yards distance and could make out a cart from 100 yards away, but owing to escaping steam did not actually know it was one until he struck it.

15. I conducted tests at Rohtak with the Divisional Rolling Stock Officer and Divisional Engineer on the night of 10th January 1930 from the footplate of an engine with a Sunbeam searchlight 14″ dia., fitted with metal reflectors and a 250 Watt bulb which the makers claim gives 600,000 beam candle power.

An empty bullock cart was placed across the track on a level crossing, the weather being fine and dark.

The following results were obtained:--

Item.	Stationary.	Speed 15-20 M. P. H.	Speed 25-30 M. P. H.	
	Ft.	Ft.	Ft.	
First view of object	1,200	1,150	1,100	Speed deduced from rail joints passed over.
Actual view of cart	900	850	800	

16. Allowing for footplate difficulties and considering that the same alertness of mind, quickness of eye and hand are not common to all and that momentory lapse or hesitation, resulting from psychological or physical factors, when operating at high speed, may neutralise all safeguards given to a Driver, I consider that Driver Harris has underestimated the distance from which he first saw the obstruction and did not act promptly, if at all until he struck the cart. It must be admitted in his favour that judging distances from the footplate is not an easy matter especially at night.

17. Driver Harris states that he destroyed full vacuum 450 ft. from the crossing yet he covered 486 ft. more before his engine came to rest. In addition to the retardation of the brake on the whole train there was the retarding effect of the debris of the cart for some 420 ft. after it struck the second level crossing, of the derailed wheels running on the sleepers and ballast for 386 ft. and the impinging of the left wheel against the flanges of ten fishplates which were bent and distorted.

18. If Driver Harris' statement is accepted that he was running at 50 miles per hour the distance his train ran after full application of the brake is not improbable as the rails were wet with dew.

Tests were conducted near Lahore with a train of 10 bogies and it was found at 35 miles per hour by an emergent and complete application of the vacuum brake the train could be brought to rest in about 600 ft., allowing for wet rails this would be about 700 ft.

In view, however, of the facts cited above as to his speed and the results of the tests made by me I consider he was not alive to his responsibilities and as vigilant as he should have been. He either deferred the application of the vacuum brake until it was too late or did not see the cart at all and did not take advantage of the searchlight expressly provided for such emergencies.

In either case he is guilty of negligent driving in contravention of Section 101 of the Railway Act.

Driver Harris was a straightforward witness but in his efforts to vindicate himself ; has not disclosed the correct facts he has been punished on three occasions for ignoring engineering signals, for running against a disc signal and for not observing caution when approaching a level crossing ; his record generally is an average one.

19. The train was taken over at Delhi in good order, the vacuum was tested by Driver Harris when he hooked on at Delhi and though he alleges that it took rather more vacuum to destroy than was normally required to stop the train, he had gauged the feel of it before he got to Rohtak. No report had been made as to the brakes on the engine being defective, adjustments had been made in shed to take up the normal wear of the brake blocks in November 1929 ; the engine was taken over by Driver Harris in good order.

He had adequate rest at Delhi before his trip on 15 Up Express.

20. The latent danger of unmanned level crossings, especially at canal bridges, is once again forcibly brought out ; it is a singularly fortuitous circumstance that the engine got over the canal bridge in safety even though the cart was on the cowcatcher. Had it been loaded to its full capacity or with sacks of grain the results might have been serious.

This is the third accident at an unmanned level crossing at a bridge in six months, and the worst as far as the railway is concerned in that it is the only case of a train being derailed.

21. A point of some importance is the range of view of engine searchlights, I am not aware of the reasons underlying their use, if it is to give a driver a sense of security by merely lighting up the view ahead they serve the purpose. If, however, the intention is that driver should see an obstruction or damaged track in time to pull up their utility at speeds of more than 35 miles per hour seems open to question.

22. The adoption in running sheds of separate books for each engine would be an advantage ; at present one has to wade through them to pick out entries regarding any particular engine ; they would also serve a useful purpose in that the inspecting officers could see at a glance how any engine is faring.

23. A serious irregularity in train working brought to light was the action of Khub Chand, Assistant Station Master, Karainthi, in reporting to the Train Controller, Delhi, that 15 Up Express has passed through his station at 23-40 hours when it had not even arrived at his outer signal ; it is of no use elaborating operating work if staff treat matters so lightly and it is hoped the administration will deal with the matter and ensure that such haphazard working will not be tolerated.

BURMA RAILWAYS.

COLLISION BETWEEN MOTOR BUS NO. R. R. 1609 AND THE ENGINE OF NO. 53 UP AT THE LEVEL CROSSING, MILE 361|6, ON 27TH DECEMBER 1929.

FROM MR. R. R. BYRON, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A., BURMA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 117-A., DATED THE 10TH FEBRUARY 1930.

1. In accordance with Rule (7) of Railway Board's Notification No. 120-T.-18 of 21st March 1923, I have the honour to submit herewith my report on the enquiry held at Taungtha into the circumstances attending the collision between Motor Bus No. R. R. 1609 and the engine of No. 53 Up at the level crossing mile 361|6 on 27th December 1929.

The following officers were present :—

J. M. G. Doog, Esq., District Engineer, Mandalay.

J. H. Cardew, Esq., District Locomotive Superintendent, Mandalay.

E. McCarthy Igo, Esq., District Traffic Superintendent, Mandalay.

U. Saw Hla Pru, District Magistrate, Myingyan.

C. F. Kluseman, Esq., Assistant Superintendent of Railway Police, Mandalay.

H. Ah Kway, Township Officer, Taungtha.

R. R. Byron, Esq., Government Inspector of Railways.

Description of the Accident.

2. On 27th December 1929 at about 11-46 hours whilst 53 up Mixed was approaching the level crossing, a Motor Bus, carrying eight persons including the Driver and partially loaded with bags of rice, was driven up to the crossing and came into collision with the cowcatcher of the engine resulting in the complete destruction of the bus and the death of four persons. Of these two were killed instantly ; one man died on the way to hospital and the fourth the following day in hospital. The remaining four passengers escaped with minor injuries, and returned to their homes. The killed included the Driver of the bus, his spare man and a policeman who were seated on the front seat ; the fourth man was seated inside the bus on top of the rice bags. The remaining four passengers who escaped were seated at the back of the bus.

From the evidence it would appear that the chassis was carried from underneath the body and thrown down the bank. The body after parting from the chassis dropped on the road more or less intact without overturning and it is due to this that the remainder of the passengers escaped.

Description of the Locality of the Accident..

The accident occurred on the P. W. D. Road leading from Taungtha to Poppa at the Level Crossing at mile 361|6 outside Taungtha Station. This crossing is approximately halfway between the Up Outer Signal and the facing points. From the Up Outer to the station the line is straight with a gradient of 1 in 100 falling towards the station ; beyond the Outer Signal the line curves to the east. This portion of the line is on sidelong ground rising from east to west. The road approach to the level crossing from the east is on an up grade of roughly 1 in 40 and after crossing the railway the road continues on an up gradient towards the west. At the time of the accident the bus was travelling up the hill from east to west.

On the east side of the line at about 140 feet from the track a pepul tree and some palms obstruct the view ; the west side of the line is open. The Driver of a road vehicle approaching the line from the east, on emerging from the group of trees at a distance of 135 feet, has a clear view of the railway as far as the outer signal 750 feet away, and would have ample time to stop before reaching the crossing if a train is on the line. On the other hand the Driver of an Up Train cannot see what is approaching on the road from the east until whatever is on the road is within 135 feet of the line when it may be too late for him to stop his train clear of the crossing.

The crossing is not protected in any way, either by gates or whistle boards on the Railway, or by boards on the road to warn road users that they are approaching the Railway.

The Evidence.

The evidence shows that the Driver of the bus approached the crossing at a high speed and made no attempt to stop, apparently expecting to get over the line before the train reached the crossing, but misjudged the speed of the oncoming train.

I cannot accept the statements of the guard and driver that speed of the train at the time was between ten and twelve miles per hour. The speed was probably more nearly twenty miles per hour, judging by the effect of the impact on the motor bus and the distance the train travelled after the collision. The train consisted of 5 bogie passenger vehicles and a tank wagon, the rake being taken as equivalent to 11½ units. The train was drawn by a K. S. Type engine and had the vacuum brake throughout. Such a train travelling at a rate of ten to twelve miles per hour could be pulled up within one hundred feet. 20 miles per hour was not an excessive speed to approach the crossing as the driver, seeing from the outer signal that the road ahead was clear had every reason to suppose that anything approaching from either side would stop to allow the train to pass. I do not therefore blame the driver who appeared to have been surprised by the sudden approach of the Motor Bus.

Conclusions.

There is no doubt that the accident was due to the Driver of the Motor Bus trying to rush the crossing. The passengers inside the bus, who were engaged in conversation, did not see or hear the train but were aware that they were approaching the level crossing. One said that the driver accelerated ; others that they were travelling at normal speed ; all were agreed that there was no reduction in the speed.

Although it cannot now be said whether the driver or his companions on the front seat saw the train or not he certainly maintained a high rate of speed either with a view to crossing ahead of the train or to gaining momentum to get up the rise on the other side. The probability is that he saw the train but misjudged the speed at which it was approaching.

Recommendation.

In view of the fact that there is a considerable amount of Motor Traffic over this road both day and night, the provision of gates and gatemen is essential. In the meantime until the gates are provided a temporary barrier should be provided and two gatemen immediately appointed for the protection of this crossing day and night.

This level crossing being within the outer signals, it's protection devolves upon the Traffic Department. The staff at this station consists of a Station Master and an Assistant Station Master and one Traffic Jemadar only. The latter has to man the points for all trains ; apparently he works day and night and it would be impossible for him to take any notice of what is happening at the level crossing. The immediate provision of gatemen is absolutely essential.

APPENDIX REGARDING MEDICAL ARRANGEMENTS IN CONNECTION WITH THE ACCIDENT WHICH TOOK PLACE AT THE LEVEL CROSSING AT MILE 361-6 ON 27TH DECEMBER 1929, ON THAZI-MYINGYAN BRANCH.

1. First aid was rendered to the injured by the guard and the Assistant Permanent Way Inspector on the spot.

2. The injured were carried to Myingyan and sent to the Civil Hospital there, this being the nearest hospital to the scene of accident.

3. The dead bodies were sent in the same train and made over to the civil authorities at Myingyan for disposal.

The nearest Railway Dispensary is at Thazi Junction and is in the charge of a Sub-Assistant-Surgeon and the District Medical Officer is at Mandalay ; it was not possible for either of these officers to render any assistance.

There was no complaint of any want of attention to the injured.

EAST INDIAN RAILWAY.

COLLISION BETWEEN 72 DOWN PESHAWAR-LUCKNOW EXPRESS AND 557 UP GOODS AT CLUTTERBUCKGANJ STATION ON 10TH JANUARY 1930.

FROM L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 800-T., DATED THE 18TH JANUARY 1930.

In accordance with Rule 7 of Railway Department Notification No. 120-T.-18, dated 21st March 1923, I beg to submit a full report of an enquiry I held at Bareilly on the 11th instant into the causes and circumstances attending a collision between 72 Down Express and 557 Up Goods which occurred at Clutterbuckganj station on E. I. Railway, 5 miles from Bareilly Junction soon after mid-night of 9th|10th instant.

2. I arrived at Bareilly Junction on the evening of the 10th, carefully examined and tested the signalling and interlocking at Clutterbuckganj and held an enquiry and recorded evidence at Bareilly Junction on the 11th instant.

3. The enquiry at Bareilly Junction was attended by Maulvi Abdul Qadir, A. L. V. I., Railway Magistrate, Bareilly, Thakur Brij Raj Singh, Deputy Superintendent of Railway Police, Lucknow, Mr. Marriott, Divisional Superintendent, E. I. Railway, Moradabad, and the Divisional Officers of the Moradabad Division.

The District Magistrate of Bareilly Mr. G. F. B. Muir, I.C.S., had visited the scene of accident in the early hours of the 10th, examined the working of the station and had helped greatly at a preliminary recording of evidence by the Divisional Superintendent on the 10th instant.

Description of the Accident.

4. Under orders of Control, the Station Master, Clutterbuckganj, was told to receive 557 Up Goods train on his 1st loop and to hold the train at his station to pass, first, a Down Empty Coaching Special, and later, 72 Down Peshawar-Lucknow Express.

5. 557 Up Goods was received on the 1st loop at 23.40 and the Down Coaching Special was run through at 23.47, all signals were thrown to danger, keys returned to their slots and the pointsman at the Down facing points, apparently knowing nothing of 72 Down and anticipating that the next train movement would be the departure of 557 Up Goods from the 1st loop, set the facing points for the first loop and went off towards the station as his hour of relief was mid-night.

6. 72 Down Express entered the station, took the turn-out for the 1st loop for which the Down facing points were set and collided head-on with 557 Up Goods standing on the 1st loop.

7. The Engine of 72 Down Express mounted the buffers of the engine of the Goods train and considerable damage was done to both Locomotives. The tender of the Goods engine was flung across the track and the first 4 wagons of the goods train were derailed and capsized, two on each side of the 1st loop blocking both Main line and 2nd loop. The 1st coach of 72 Down Express was a bogie composite III and Inter-Class and the 2nd coach a bogie composite Brakevan and III Class. These two coaches were telescoped into each other for about half their length. Little or no damage was done to the remaining 8 coaches of the Express or the 60 wagons of the Goods train. None of these was derailed.

8. The casualties were serious. Of the two engine crews, the crew of the Goods train jumped off their engine before the actual collision, and of the crew of 72 Down Express, the driver stuck to his engine and escaped

unhurt, the first fireman jumped from his engine before the collision and was seriously injured, the 2nd fireman on the engine was slightly bruised and is suffering from shock.

Among the passengers 11 were killed and one died soon after arrival in hospital at Bareilly making a total of 12 killed. There were 18 others more or less severely injured who were conveyed by road ambulance under the care of Lieut.-Colonel O'Neill, the Civil Surgeon, Bareilly, to the Civil Hospital, Bareilly, where they are receiving every attention and I understand it is anticipated that all are expected normally to recover.

9. There were undoubtedly a few others very slightly injured in the coaches to the rear of the two that were telescoped. These proceeded to their destinations by the same train but received attention at Bareilly, Shahjahanpur and Lucknow, the Railway Medical authorities of which stations had been warned to meet the train and attend to any persons needing attention.

10. The relief train from Bareilly arrived at 1.50 or about 1 hour 40 minutes after the accident. The relief train from Moradabad arrived at 4.15.

Description of the site of the Accident.

11. The collision occurred at about 0.05 hrs. of 10th January on the 1st passing loop of Clutterbuckganj station, mile 348½, 5 miles from Bareilly Junction, E. I. Railway Main Line Moghal Sarai to Saharanpur.

12. Clutterbuckganj station yard has 3 lines for crossing trains, the main or run through line with two passing loops. The Signalling and Interlocking provided is the old List and Morse, improved by key locking for a 3rd line, the provision of special starters for each line and electric key transmission to the facing points. The section is worked on Electric Tokens which electrically lock all starter signal keys. Movement of trains is controlled from a Control office at Moradabad. The Signalling and Interlocking, the Electric Token and Control were all in good working order at the time of the accident.

13. The Down approach to Clutterbuckganj is a long straight approach on a low bank over 2 miles. There is no grass growing on the bank and no trees near the line. Evidence varies as to haze, mist and smoke, but even when these are suggested it was agreed that signals were clearly visible for more than an adequate distance. When visibility was tested on the following night at the same time and under the same conditions this was fully confirmed.

14. There is no cabin, but a wooden hut is provided at the facing points, for the pointsman to occupy during his 6 hours of duty. The hut contains the frame in which the facing points keys are locked. The special key required for the line on which a train is to be received is electrically released by the Station Master by a control master key from his office. The hut is provided with a telephone and is in telephonic communication with the Station Master's office. The pointsman is required to be in his hut for full duty hours and not to leave it without the permission of the Station Master on duty. The hut is locked by a padlock the keys of which are handed from pointsman to pointsman as they change duty.

The Evidence.

15. The Driver himself states that—

(1) when a mile and a half outside the outer signal he saw that this outer signal was lowered for him but that the warner was at danger ;

(2) that he then busied himself shovelling coal and attending to his injectors and never looked at his signals again till ;

(3) he was right on the home signals at the facing points and saw that they were all at danger ;

(4) he then just had time to put his brakes on hard and reverse his gear before the collision occurred.

It will be seen therefore that the Driver by his own statement admits that he—

(*a*) Ignored the possibility of a drooping outer signal of which he admits he was aware.

(*b*) Totally disregarded the significance of the Warner signal being at danger.

(*c*) At a time when his one thought should have been to which his signals, busied himself with shovelling coal, a job for which two firemen were provided.

(*d*) Had no special reason for coaling when approaching and running through a station as his train was on time.

16. Against this we have the following extenuating circumstances to which his superior officers bore witness—

(*a*) The firemen were inexperienced and somewhat inefficient.

(*b*) The Engine was one in which it was difficult to maintain full steam pressure.

(*c*) The coal supplied to this Express train was really of a quality only suited to goods trains and low speeds, etc.

(*d*) Mr. Shortt is a young man with a very good record, very steady and very keen, who had only recently been promoted to the driving of Mail and Express trains and was keen on justifying this selection for promotion.

17. All other evidence goes to show that all signals including the outer signals were at danger. This was borne out by the position of keys and points after the accident and by a test made the following night at the same hour under the same conditions and again in the morning before anything was done to signals and interlocking gear none of which was damaged by the accident. The outer signal was found not to droop or to stick ; and to fly back freely to the danger position when released. The test was made to prove the certainty of the outer going back to danger correctly when the lever was thrown back after the passage of the Down Empty Special just before arrival of 72 Down Express.

18. The evidence concerning the action and movements of Sudeshwar Narain, Pointsman, also needs consideration. This man was to be on duty at the Down facing points till 24.00 hrs. when he was to be relieved by Ram Chandra Pointsman. He undoubtedly knew of the arrival of 557 Up Goods at 23.40 hrs. and locked points and lowered signals for the passage of the Down Empty Special at 23.47. He also unlocked and released the points, reset his levers to normal and returned the key to the transmitter in his hut because the points were set for the loop and free after the collision and were so held by the bogie wheels of a coach of 72 Down standing on the toe of the switch. Also the Main line key was found in the key transmitter and the hut locked. He says he then made over charge to Ram Chandra pointsman *at the points* and went off to his rest, but all the evidence is against this and is in support of the theory that—

(1) He did not know of the imminent arrival of 72 Down.

(2) He thought that the next train movement would be the departure of 557 Up Goods and to set the points for the 1st loop.

(3) As there were no keys to be manipulated, points to be locked or signals to be worked from his or near it (The starter signals are worked from the platform lever frame) and his time of relief was near, he went off to the station intending to make over charge to his relief at the station.

(4) He locked his hut and went towards the station and I consider that Durjan's evidence truthfully tells of his movements after that.

19. All evidence bears out the prompt adoption of relief measures, the wide and early circulation of requests for outside aid and the prompt and full response of all concerned to these requests.

Conclusions.

20. Even accepting the Driver's own statement, he is primarily responsible for the accident by disregarding the warner signal, and running past the Home signal at danger and being so far criminally wanting in an appreciation of the situation as to shovel coal and not observe his signals when approaching a station at high speed and when he had observed the warner signal at danger to indicate that he was not to be run through the station.

21. My own opinion is, with a keen young man of Mr. Shortt's type that he was probably shovelling coal and attending to his engine, and when he was doing this he passed the warner and outer at danger without seeing them (because the outer was at danger and that would certainly have sopped him) and that when he next looked up thinking he was approaching Clutterbuckganj, he found he was almost at the Home signals and these were all three against him. He then did all he could to stop his train and stuck to his engine while his first fireman jumped off and his engine when examined by me was seen to have the vacuum brake hard on and the driving gear in reverse where it was jammed and immovable.

22. I consider that Driver Shortt is responsible for the collision and should be prosecuted and I understand this action is being taken.

23. Further, I consider that had Pointsman Sudeshwar Narain not deserted his post and left his hut before his relief arrived, and even before his relief was due, there would have been no accident. Had he been present in his hut at 23.52 he would have had the Assistant Station Master's instructions that line clear had been given for 72 Down and points would have been correctly set and signals lowered for this train as there was ample time to do this before the train actually arrived at 0.05. Further he had no business to suppose that the next train movement would be the departure of 557 Up Goods and to set the points for the 1st loop. should have left his points set for the Main line which was their normal position. But he thought he may be sent back from the station to reset the points for the departure of the goods train and so did the movement before he left the points to save himself the trouble of walking back to the points.

This man's case is to be dealt with departmentally at present and his prosecution left to the consideration of the District Magistrate, Bareilly, who is being furnished with a copy of this report.

Medical Aid and Relief Measures.

24. Mr. Reay Young, Assistant Superintendent, Watch and Ward, E. I. Railway, Lucknow, was a passenger by 72 Down and immediately after the accident organised relief measures. He telephoned to Moradabad for the Moradabad and Bareilly Relief trains and asked for all possible medical aid from both Bareilly and Moradabad. Two British soldiers who were passengers volunteered to run and walk into Barielly for medical relief. Mr. Reay Young then with the help of Mr. Robins, Assistant Superintendent of Police, U. P. and 7 British soldiers, who were all passengers and some Indian passengers began to extricate the injured and to all that was possible for them.

25. The Railway authorities at Moradabad, as soon as they received the news, telephoned the Station Master, Bareilly, to send out the Relief train and to enlist all the help he could. The Station Master, Bareilly, sought help from the Civil Surgeon, Bareilly, the Officer Commanding the British Station Hospital for ambulances and the Officer Commanding, the Military Transport Company, for lorries. The response from all sources was prompt and to their full capacity. Lieut.-Colonel O'Neill, I.M.S., Civil Surgeon, Bareilly, went out to Clutterbuckganj by the Bareilly Relief train and arrived there at 1.50 hrs. with Assistant Surgeons, medical equipment and stores. He immediately attended to all the injured and saw them loaded and evacuated by the Ambulance sent out promptly by the Officer Commanding the British Station Hospital and the full fleet of lorries brought to Clutterbuckganj by the Officer Commanding the Military Motor Transport Company. Colonel O'Neill returned to Bareilly with the injured and received them in the Civil Hospital where they were attended to and are at present all accommodated and all are doing well.

26. First aid was rendered by the Assistant Surgeon attached to the Match Factory at Clutterbuckganj before the arrival of the Bareilly Relief train. And later the Salvation Army, Seva Samiti and Anjuman Islamia of Bareilly as soon as they were informed of the accident all promptly turned out and helped.

27. Of the 12 killed, 11 were extricated from the wreckage and one constable Mohan Singh died soon after arrival in Hospital at Bareilly. The bodies of the 11 killed on the spot were made over, the Hindus to the Seva Samiti for cremation and the Mahomedans to the Anjuman Islamia for burial.

28. There were a few other passengers who were very slightly injured but insisted on going on with 72 Down reconstituted by drawing clear the 7 bogies and one 4-wheeler that were undamaged. Some of these slightly injured were rendered first aid at Clutterbuckganj before departure and the Railway Medical Officers concerned were asked to meet the train at Bareilly, Shahjahanpur and Lucknow and render any further attention that might be required. This was done.

29. The Bareilly Relief train arrived at the site of the collision at 1.50 hrs. and the Moradabad train at 4.15 hrs. One passing loop was cleared by 3.30 hrs. and the Main line by 18 hrs. The first passing loop on which the collision occurred is still blocked and will take some days to clear.

30. I consider that the very best arrangements possible were made for rendering medical assistance to the injured, for disposing of the dead and for clearing the lines. The response made to the appeal for help by the Civil Surgeon, Bareilly, the Military authorities and public bodies like the Seva Samiti, Anjuman Islamia, Salvation Army, Bareilly, and the Match and other factories at Clutterbuckganj was very generous, prompt and efficient and I understand the Railway Administration is acknowledging its indebtedness. Mr. Reay Young praises particularly the help given him by Drummer Bristow of the East York Regiment. Lucknow, and Lance Corporal Torr and Riflemen Somerville, Mitchell. Page Astrop and Roberts all of the Kings Rifle Corps, Lucknow, who were all passengers by 72 Down.

BENGAL NAGPUR RAILWAY.

COLLISION BETWEEN DOWN BHAGA I GOODS TRAIN AND UP JAMADOBA PILOT AT BHOWRA BLOCK HUT ON 30TH JANUARY 1930.

FROM MR. H. LAWTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, NEW DELHI, LETTER No. 387|XIII|30, DATED THE 18TH MARCH 1930.

In accordance with rule 7 of Railway Board's Notification No. 120-T.-18, dated the 21st March 1923, I submit a report on an enquiry held by me at site and at Bhojudih and Adra Stations on 3rd—6th, 12th and 13th February 1930.

2. The following were present throughout the enquiry :—

Mr. G. S. Pelly, Coal Manager, Adra.

Mr. J. M. Watson, District Loco. and Carriage Superintendent, Adra.

Mr. G. Somers Clarke, District Engineer, Adra.

3. The following were present on several days :—

Mr. W. C. Magrath, Superintendent of Police, B. N. Railway, Khargpur.

Mr. E. W. Cosserat, District Engineer Signals, Sini.

Mr. J. W. Marshall, Assistant Transportation Officer, Adra.

Mr. D. A. S. Conran, Assistant Loco. Superintendent, Adra.

Babu J. P. Roy, Inspector, Government Railway Police, Purulia.

M. A. Hadi, Sub-Inspector, Railway Police, Adra.

II.—*Description of Accident.*

1. On 29th January 1930 Up Jamadoba Pilot (consisting of 1 engine tender foremost, 7 four-wheelers including a hand crane and dummy, and 1 brakevan) left Bhojudih for Jamadoba at 23.35 hours, ran by the North Line from Sudamdih to Bhowra and was held at Bhowra north up outer signal at about 23.48 hours.

2. On that night and more or less at the same time Down Bhaga I was to run and the intention was that these two trains should cross at Bhowra Down Bhaga I proceeding by the South line from Bhowra to Sudamdih ; and line clears were given accordingly. Down Bhaga I however did not get away from Bhaga as early as was anticipated ; so, to avoid detention to Up Jamadoba Pilot it was decided between 23.45 and 23.55 hours that it (Up Jamadoba Pilot) should be diverted *via* Mohalboni and Bhutgoria, which is in direct continuation of the South Line, and movement from the North Line across the South Line was started. This movement took longer than usual as outer and home signals could not be lowered and Up Jamadoba Pilot had to be piloted past them.

3. Meantime Down Bhaga I (consisting of 1 engine, 47 loaded four-wheelers, and 1 brakevan) left Bhaga at about 0 hours, passed Jamadoba at 0.13 hours, passed Bhowra down signals in " on " position and with with the facing points set for the North Line took that line and collided with Up Jamadoba Pilot at 0.25 hours, just as it was about to take the crossover to the South line. The Driver of Up Jamadoba Pilot saw Down Bhaga I coming, so put his brakes on.

4. The speed and weight of Down Bhaga I as compared with that of Up Jamadoba Pilot were such that though both engines were derailed, the two travelled about 400 feet before coming to rest ; eleven vehicles on Down Bhaga I were derailed and telescoped and 7 vehicles on Up Jamadoba Pilot were derailed and telescoped.

5. A few hours after the accident the brakes on Down Bhaga I were examined by several of the staff ; the engine steam brake and tender hand brakes were found hard on and the brake blocks shewed signs of excessive over-heating, being found still warm to the touch ; the vacuum brake blocks on the train were found cold and did not appear to have been on. The hose pipes were found coupled up to about the thirtieth from the engine.

6. Three persons were killed outright, they appear to have been asleep on the crane dummy on Up Jamadoba Pilot. The engine crews all jumped and a few others who were on the trains, some of whom received injuries in jumping. Immediate medical aid was rendered, and the injured persons, ten in all, were sent to Adra Hospital at 6.15 hours.

7. The debris blocked both North and South Lines. The South Line was cleared by the evening of 30th January, and the North Line was cleared by mid-day of 3rd February.

Description of Locality of Accident.

1. For sketch of lines from Bhojudih to Bhaga and for signalling at Bhowra see sketch attached. The north and south lines from Sudamdih to Bhowra are separate single lines. The Up direction is from Bhojudih to Bhaga.

2. From the scissors crossing the line to Jamadoba curves to the right up to the outer signal and then runs straight for a mile, with an up grade all the way to Jamadoba down outer signal a distance of 3 miles, on a 1 in 100 grade throughout except for a short length of 1 in 300 at the centre ; and from that point it runs level for 3|4 mile into Bhaga. The line to Mohalboni curves to the left and is on a steep up-grade also.

3. Signals are outers with fixed warners, bracket homes, and starters. The scissors crossings are interlocked with the signals. Though the locking was all in on the date of the collision the station was being treated as uninterlocked (in connection with splitting up the scissors). The 4 block sections all have token instruments. The home signals giving access to each block section are normally locked "on " and can only be released by a key for that section obtained from the token instrument for the section in the " sending " position ; so that no train can be signalled into a block section unless line clear has been obtained for it ; for if token instruments fail signals are kept " on " and trains are piloted past them, and this was actually the case for the Mohalboni section.

4. For the working of Bhowra station and the two lines to Sudamdih there are special working rules. Briefly they are :—

(*i*) no through train may be permitted to approach Bhowra unless permission to approach has been obtained for the block section ahead.

(*ii*) in report for a train must not be given by Bhowra until it has cleared the block section ahead.

(*iii*) if both the north and south lines to Sudamdih are occupied by a train Bhowra may with Sudamdih's consent give Jamadoba permsision for a down through train to approach with the intimation " Bhowra-Sudamdih section is not clear " and keep his down signals " on ", which requires the driver of the down train to be warned of this by caution order

(*iv*) as far as possible trains *via* Jamadoba should run by " north " line and trains *via* Mohalboni should run by " south " line.

5. About 200 feet in front of the scissors facing points is a speed restriction board bearing " Loop points speed restricted to 10 miles per hour ".

6. Down trains from Jamadoba had at the date of the collision three speed controls to observe as they approached Bhowra with signals off :—

(*i*) the fixed warner meaning " proceed with caution ".

(*ii*) the possibility of having to take the scissors crossover at 10 m. p. h. the earliest that the home signal can be seen being at the outer signal, due to curve and cutting.

(*iii*) 10 m. p. h. over facing points which were being treated as uninterlocked.

Conclusions.

1. From consideration of the depositions of Bhowra staff, the locking in the signal lever frame of the time that the scissors crossover was set for the Up Jamadoba Pilot to go from the north line to Mohalboni and of the fact that the locks on the home signal lever could be released only by token instrument keys and of the state and position of the token instruments, I conclude that the outer and home signals at Bhowra applying to Down Bhaga I were kept continuously " on " against that train as it approached from the pont where the outer was first visible ; and that the train failed to obey these " on " signals but ran past both of them, constituting a double breach of General Rule old 312 and 314|new 76 and 78 for which I hold Driver P. Chinniah of Down Bhaga I responsible.

As regards the contention of Driver P. Chinniah of Down Bhaga I that he saw the home signal off for the north line from the " sand overhead way " about 3|4 mile outside the outer signal, I had a look at these signals by night and very much doubt whether the home signal would be visible from there even to a trained eye, particularly whether " north " or " south ". And as regards his contention that the outer signal was " off " till he got right up to it and was then thrown " on " just in front of him, the considerations mentioned above are opposed to this.

2. From consideration of the following facts :—

(*a*) that the engine brake blocks showed signs of excessive overheating and wear, and that the wheel treads were scored ;

(*b*) that the brake-blocks of the coupled vacuum-fitted vehicles showed, after the collision, no signs of recent heating or wear, and that the wheel-treads were bright ;

(*c*) that the engine brake blocks were found to be still warm a few hours after the collision, while the vehicle brake-blocks were cold ;

(*d*) that both the engine steam and tender hand brake handles were found fully on, while the vacuum ejector disc was off its seating (it was subsequently found buried in the coal in the engine-cab) ;

(*e*) that the speed of Down Bhaga I was high (I estimate it as 40 miles per hour) as indicated by the distance travelled between the point of impact and the point at which it came to rest ;

I conclude that Down Bhaga I descended the down grade from Jamadoba without the vacuum brake in operation ; and as the down grade starts only 3|4 mile out of Bhaga, that Down Bhaga I left Bhaga without the vacuum brake in operation ; whereas a train of the length and weight of this train is required by the Working Time Table of the Adra District to have not less than 12 active vacuum braked vehicles in operation. All this constitutes a breach of General Rule old 234|new 163 and of the Rules for the Working of the Automatic Vacuum Brake on Passenger and Goods Trains (Enclosure to Government of India Railway Department letter No. 809-T., dated 8th June 1915), more particularly rules 5 (*d*) and 13 (*b*), for which I hold Driver P. Chinniah mainly responsible ; but

Guard P. Brennan also does not seem to have carried out his share of duty though a Guard's responsibilities are particularly mentioned in General Rule old 271 (*b*) and (*f*)|new 113 (*b*) and (*f*).

As regards the contention of Driver P. Chinniah of Down Bhaga I that he controlled the train with the vacuum brake on the upper portion of the grade at 8-10 m. p. h. and was running at 15 m. p. h. only at the outer signal, and that when he applied the vacuum brake at the outer signal it failed to respond, the considerations mentioned above are opposed to this contention.

3. Several witness have alleged that Down Bhaga I departed from Bhaga non-vacuum owing to a defect in the vacuum ejector on the engine and the Assistant Train Examiner of Bhaga Up Yard has noted in his diary that Up Bhaga I which that engine brought from Bhojudih to Bhaga (arriving about an hour before it departed with Down Bhaga I) apparently arrived non-vacuum for he found the vehicle vacuum pistons down and he saw the Driver repairing his vacuum ejector. There is much importance in the statement of Bhaga staff about the Vacuum Memo. for Down Bhaga I, of which the " record " " advice to station master " portions have been found and preserved, but the " advice to driver " portion is missing.

As regards Driver P. Chinniah of Down Bhaga I having departed from Bhaga with his vacuum ejector (using the word generally) defective,—which would constitute a breach of General Rule old 291|new 116, and which he denies,—the evidence of the Bhaga staff to this effect is supported by the state of the engine brakes and brake handles as found shortly after the collision, coupled with the fact that the vacuum disc was missing from its seating (it was buried in the coal in such a way that the Loco. Foreman is of opinion that it fell there when the collision occurred) ; I think the weight of evidence is that on departure the vacuum ejector on the engine of Down Bhaga I was not working and vacuum had not been created.

As regards the Vacuum Memo. for Down Bhaga I, I have doubts about its having followed the proper and timely procedure that it should. I think that the Assistant Train Examiner Anant Lall, knowing that Down Bhaga I had not got its prescribed brake power and having fears as to its safe arrival at destination, did not show a proper sense of his responsibility in taking the signature of the A. S. M. on the Vacuum Memo. and giving him his " Advice to Station Master ", even though it did bear an endorsement " left non-vacuum being engine defective driver took the train in the same condition ". He should have withheld the Memo. advising the A. S. M. and Guard accordingly. Also I think that A. S. M. J. N. Lahiri did not show a proper sense of his responsibility in letting Down Bhaga I start on such an endorsed Vacuum Memo. at least without a reference to control, see General Rules old 234, 252 and 253|new 105, 114 and 163.

4. From the rules and instructions which were in force the running of Up Jamadoba Pilot on the " North " line from Sudamdih to Bhowra was quite in order.

5. As regards the train movements of Up Jamadoba Pilot and Down Bhaga I at Bhowra prior to and at the time of the collision, there have in the past been crossings of an up through train on the north line held at the outer signal and a down through train running *via* the south line, the nature of such crossings being " junction " not " station loop ". Such a crossing was intended in the case of Up Jamadoba Pilot and Down Bhaga I on the night of the collision, and permission to approach was obtained and given for Down Bhaga I accordingly, then subsequently this train (actually as it was approaching) had its " clear " south section from Bhowra to Sudamadih broken at the " junction " facing points and obstructed by Up Jamadoba Pilot just behind them. There does not seem to be any station working rule dealing directly with such a breaking and obstruction of an established " clear " section for a down through

train ; but there is a rule that when neither section is clear permission to approach from Jamadoba must have an intimation that the two Bhowra-Sudamdih sections are not clear given with it. In obedience to this rule, coupled with the other station working rules, particularly in connection with giving permission to approach, the A. S. M. M. L. Bannerjee should, I think, have realized that when once unqualified permission to approach from Jamadoba had been given and was current for Down Bhaga I, there should have been no interference with the " clear " section that went with it ; and, even if this did not strike him, he should at least have realized that diverting Up Jamadoba Pilot across to the Mohalboni Branch in the face of approaching Down Bhaga I was a movement that needed proper authority and should have demanded from control an order for it under an order number.

Also I do not think that the Controller N. Mudi who was dealing with the running of Up Jamadoba Pilot and Down Bhaga I was sufficiently in touch with their movements.

Recommendations.

My recommendations are :—

(*i*) that Driver P. Chinniah of Down Bhaga I be prosecuted ;

(*ii*) that Guard P. Brennan, Assistant Train Examiner Anant Lall, A. S. M. J. N. Lahiri, A. S. M. M. L. Bannerjee, and Train Controller N. Mudi be dealt with departmentally ;

(*iii*) that the attention of staff generally be drawn to their responsibility in regard to prescribed brake power, as some of the staff seem to have erroneous ideals about it.

(*iv*) Vacuum Memo. for Down Bhaga I (No. 76 of 29th January 1930 Bhaga) should have a searching enquiry made about its signatures, times, procedure, etc.

(*v*) Vacuum Memo. meaning and procedure generally seem to need looking into.

(*vi*) Bhowra working rules seem to need amplification.

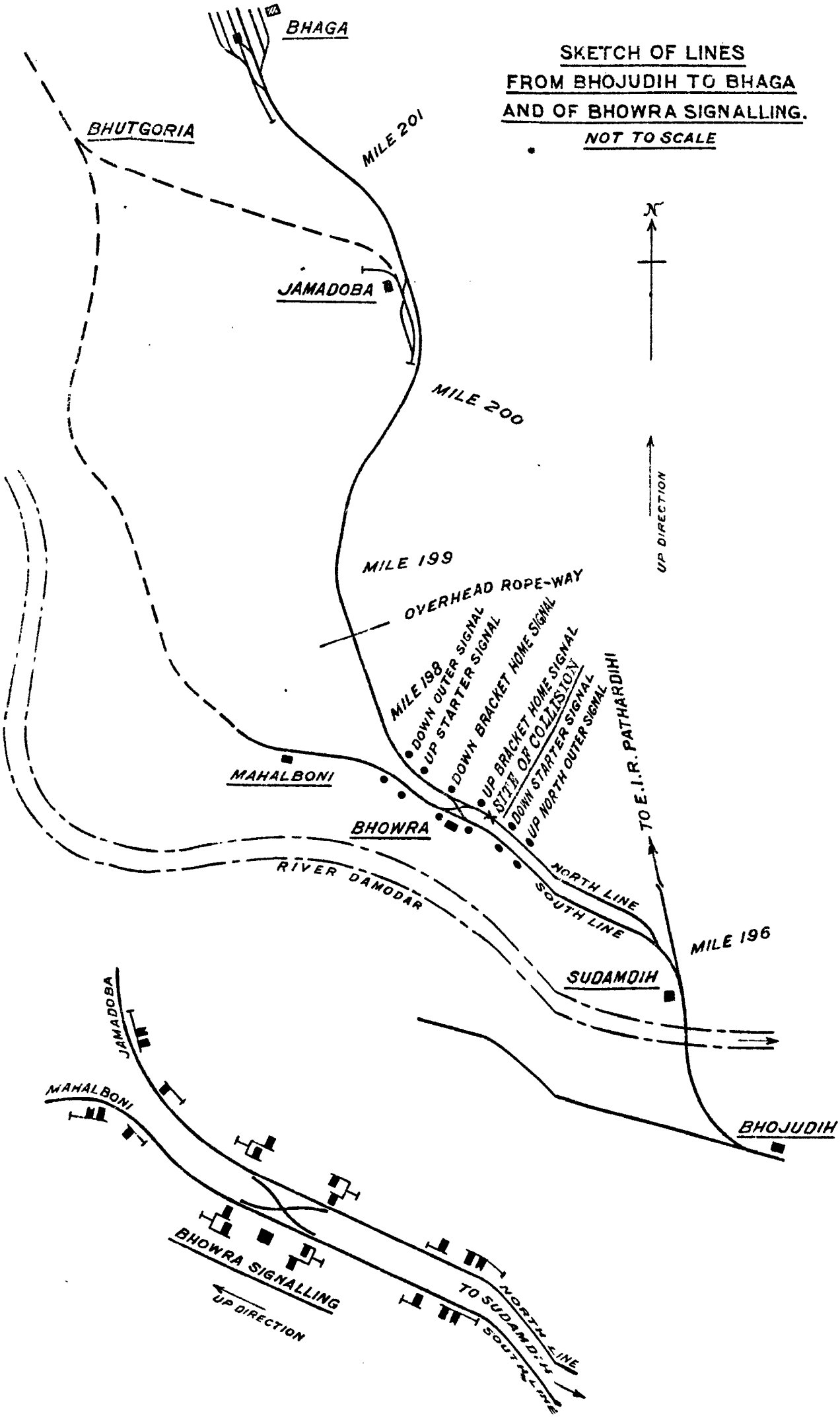
(*vii*) Control should be in closer touch with train movements over the north and south lines between Sudamdih and Bhowra.

Also generally it is for consideration whether order numbers are being sufficiently used when train movements are ordered.

(*viii*) It should be verified that the procedure for the explanation of notifications and notices to staff who cannot read them is acted up to by such staff.

(*ix*) Electric head lights should be fitted to the tender of pilot and other engines regularly running tender foremost as far as possible.

SKETCH OF LINES
FROM BHOJUDIH TO BHAGA
AND OF BHOWRA SIGNALLING.
NOT TO SCALE



EASTERN BENGAL RAILWAY.

COLLISION BETWEEN 116 DOWN PASSENGER EXPRESS AND 224 DOWN PARCEL EXPRESS (BOTH EASTERN BENGAL RAILWAY TRAINS), AT HALISHAHAR, ON THE 28TH FEBRUARY 1930.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, LETTER NO. 452, DATED THE 26TH APRIL 1930.

In accordance with the Rule 9 of the Rules for reporting accidents, No. 1926-T., dated 19th March 1930, I have the honour to submit my report on the above accident.

2. Returning from an inspection of the Assam Bengal Railway, *via* Chandpur and Goalundo, I received my first official intimation of the accident at Goalundo on the 2nd March 1930 at the same time as a notice of the convening of a District Officers' Cimmittee for the purpose of enquiry into the accident at Halishahar. The committee met on the 3rd March 1930 and was composed of :—

Mr. Matha Das, Divisional Superintendent, Commercial, Calcutta.

Mr. R. De Vere Irwin, District Loco. Officer, Calcutta.

Mr. R. Whitworth, District Signal Engineer, Calcutta.

Mr. U. N. Banerjee, District Carriage and Wagon Superintendent.

Mr. M. H. Elliott, Assistant Engineer, Kanchrapara.

3. I inspected the site of the accident with the committee and was present throughout the proceedings, interrogating the witnesses as required Mr. Bonbehari Sanyal, Inspector and Mr. A. K. Chatterjee Sub-Inspector, Railway Police watched the proceedings on behalf of the Police.

Description of the accident.

4. At about 5-12 hours on the 28th February 1930, No. 16 Down, North Bengal Passenger Express composed of :—

				Tons.
Engine No. 435 Type XB			.. ..	55
E. B.R. Coach No.	1874	Bogie third and luggage	.. ..	35
,, ,,	1662	,,	.. .. ..	32
,, ,,	1726	,,	.. .. ..	33
,, ,,	1555	,, and Inter	.. ..	35
,, ,,	1333	Bogie I and II	.. .. ..	40
,, ,,	1318	,,	.. .. ..	40
,, ,,	1606	Bogie third and inter	.. .. ..	34
,, ,,	1676	,,	.. .. ..	35
,, ,,	1869	,, and luggage van	.. ..	35
,, ,,	12	Four-wheeler officer's saloon	.. ..	12

ran into the rear of Down Parcel Express No. 224, standing at the down platform of Halishahar double line station. The composition of this train was as follows :—

				Tons.
Engine No. 53 R Type L	..	..	..	116
Molasses Tank No. 2710	empty	..	..	11
„ „ 1718	„	..	..	11
„ „ 2706	„	..	..	11
E. I. R. Covered Goods No. 38886	loaded about	..	..	15
„ „ 37893	„	..	..	15
„ „ 4295	„	..	..	14
B. N. R. „ 4284	„	..	..	14
E. B. R. Truck No. 474	„	..	..	14
„ Motor Van No. 1937	„	..	..	14
„ „ 1990	„	..	..	14
„ Covered Goods 4328	„	..	..	14
„ Luggage Van 1978	„	..	..	14
„ Motor Van 2251	„	..	..	13
„ Luggage Van 1935	Empty	..	..	11
„ Brake Van 885	„	..	..	10

5. The four last named vehicles, *viz.,* Brake Van No. 885, Luggage Van No. 1935, Motor Van 2251 and Luggage Van No. 1978, were smashed to pieces, but the remainder of 224 Down was sufficiently unaffected to be able to proceed to Calcutta. The Engine X B No. 435 of 16 Down was derailed and suffered minor damages. The passenger shed on the down platform was nearly demolished and a portion of the down platform wall was considerably damaged, necessitating rebuilding. Both up and down lines were blocked with debris, but the up line was soon cleared and Single line working was introduced on it at 7-27 hours. The down line was cleared at 16 hours and normal working was resumed at 16-35 hours. Details of damages are appended.

6. A watchman belonging to 224 Down was the only casualty. He received slight injury to his left hip.

Description of the Locality.

7. Halishahar is a cabin-worked, Class B, interlocked, Double line station, 26 miles from Calcutta, on the Eastern Bengal Railway Main Line. Two miles to the north of it is Kanchrapara, with the cabin of which its cabin is connected by Pryce and Ferriera's Electric Block Instruments and telephones. The first station to the south is Naihati.

8. With the exception of a service track running independently between Naihati, through Halishahar, to Kanchrapara, and intended only for a special goods pilot service (with a speed restriction of 10 miles per hour), there are only two lines through Halishahar Yard, an Up and a Down line, with one platform to each. Thus there is no provision for receiving two fast or passenger trains going in the same direction.

9. From the centre of Kanchrapara station to the Down Starter at Halishahar the items of interest and the intervals that separate them are as follows :—

Kanchrapara Station—1,500 feet—KPA Down Starter—6,050 feet Halishahar Down Outer and Warner—1,400 feet—Halishahar Down Home—400 feet—Halishahar North Level Crossing—1,060 feet—Centre of Down platform, Halishahar—600 feet—Halishahar Down Starter. A fog signal post exists between Kanchrapara and Halishahar Down Outer. 300 feet from the latter. Halishahar Signal Cabin is between the North Level Crossing and the rear end of the Station platform.

Evidence.

10. The morning of the 28th February 1930 was very foggy in the vicinity of Halishahar. Detonating Fog signals had been placed for all trains after 4-15 p.m. and 8 Down, 214 Down and 16 Down all exploded detonators, but the drivers of all three trains stated that these detonators were exploded between the Outer and Home signals, nearer the Home than the Outer.

11. The person instructed to place detonators on the Kanchrapara side of Halishahar station was the North gate keeper, Jahir, just as the south gate keeper was instructed to place them on the Naihati side. This was in accordance with the regular practice at this station. Jahir went out and placed three lots each of 2 fog signals, according to him at and near the fog signal post, according to all other evidence not far from the Home signal. He had been observing the fast of Ramjan for a month, his evidence was faltering and he appeared to be in an enfeebled state. At 4-15 in the morning he found his task onerous and carried it out in an unwilling manner. He had had similar duties on the morning previous, viz., the 27th February 1930.

12. 224 Down Parcels Express was received into Halishhar on the Down platform at 5-4 hours on the 28th February 1930. The signals behind her were then set to danger. She completed her work in about 5 minutes and was ready to leave, but the starter signals could not be seen. A porter was sent ahead of the train to see if the starter was actually lowered, when the guard of the train, warned by the cabin jemadar of the approach of 16 Down, gave the alarm to the staff of his train to vacate the train and ran for safety. 16 Down, known as the North Bengal Express, had run past signals and approached at such speed that the emergency application of the brake, when the driver saw the tail light of 224 Down, could not prevent a bad collision. The driver of 16 Down had missed the Down Outer signal of Halishahar and had only just seen the Down Home, which both he and his first fireman, deceived by the explosion near it of detonators, mistook for the Warner, and did not slow down, though he had his train under control, assuming the signal were the Warner, for stopping at the Starter.

13. A good deal of confusion occurred in the course of the evidence over the matter of the placing of fog signals detonators. Ten exploded cases had been found including six that the gatekeeper accounted for and two that were found alongside the rail near the North Level crossing but all found were easily accounted for because some had been placed by the Guard of 16 Down and breakdown gangs to protect the trains and had subsequently been exploded in the clearing operations.

Conclusions.

14. There is no doubt that Driver* Brown of 16 Down ran into Halishahar against signals. His only excuse is that he did not see the Outer and Warner and mistook the Home for the Warner, being misled by the detonators placed near the Home instead of in their proper place, *viz.*, 100 yards outside the Outer signal. The run from Kanchrapara to Halishahar is a short one, the booked time for 16 Down being 6 minutes At 40 miles an hour the 6050 between Kanchrapara Starter and the Halishahar Outer would be covered in 1 min. 43 seconds. With no land marks to guide him the driver could only reckon by time, but he does not appear to have done this, as he depended on seeing his signals. Having missed his Outer, and the time interval between the Outer and the Home being only 27 seconds, it was not surprising that he mistook the Home for the Warner when he detonated fog signals near it. I consider he was taking a risk because he did not slow down soon after leaving Kanchrapara. He said the fog was sufficiently heavy to obliterate all landmarks. Nothing was visible but a sea of fog and he had to cut off his

high-power head-light as worse than useless. In the circumstances he could not be certain of seeing his signals at speed and he should not have risked missing them.

15. The gatekeeper*, Jahir, is I consider guilty of very serious negligence. He knew where the fog signals were to be placed, *viz.*, 100 yards outside the Outer signals, and he states he placed them there ; but his lowered physical state after his long fast, his unwillingness expressed to the Committee, but not, apparently, to the station staff, to carry out the task, and the evidence of the drivers of three trains and a fireman that they were placed not far from the Home Signal are all against him. I have no doubt that in his weakened state he succumbed to his very great disinclination to exert himself, at an hour when his vitality was at its lowest and when he would ordinarily have been refreshing himself in the limited manner allowed during the fast, and placed the detonators only a short distance from the Home Signal.

16. This accident was due to the failure of the human element. That it was not more serious in its consequences was due to the greater portion of the shock having been expended in breaking up four lightly loaded or empty four-wheeler vans, of which the brakes were released because 224 Down was ready to go. There are mechanical devices for preventing the passing of signals and mechanical and electrical devices for the placing of detonators ; but the expense of installing these is not at present justifiable, though it might be worth while getting local knowledge by trial of mechanical or electrical detonator placers.

17. In Appendix I, " Use of Block Instruments—Double Line," of the Eastern Bengal Railway General and Subsidiary Rules, is a rule applied to Class A Stations which might for safety's sake be applied to Class B Stations. This rule is 25 a (V) and reads as follows :—

> Except where instructions are issued to the contrary, when a fog comes on, or the view of the lines is otherwise obstructed, the " Is Line Clear " signal must not be accepted from the Cabin in rear unless " Train out of Section " signal has been received from the Cabin in advance for the last preceding train, and the section ahead is clear.

BURMA RAILWAYS.

DERAILMENT OF 150 DOWN PARCEL SPECIAL AT MILE 118|15 BETWEEN NATTALIN AND ZIGON, PROME LINE, ON 18TH MARCH 1930.

FROM MR. R. R. BYRON, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, BURMA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 279 A, DATED THE 31ST MARCH 1930.

1. In accordance with Rule (7) of Railway Board's Notification No. 120-T-18, dated 21st March 1923, I submit herewith my report on the enquiry held by me into the circumstances attending the derailment of 150 Down Parcel Special at mile 118|15 between Nattalin and Zigon on 18th March 1930.

2. The enquiry was held at Zigon on 24th and 25th March 1930 in company with :—

C. C. R. Edwards, Esq., District Engineer, Lower District.

G. D. Stevenson, Esq., District Loco. Superintendent, Lower District.

F. Loveland, Esq., District Traffic Superintendent, Lower District.

Description of the accident.

3. At about 20|30 hours on the night of the 18th March 1930, whilst 150 Down Parcel Express was travelling from Nattalin to Zigon, 17 vehicles in the middle of the train were derailed, some were upset and some partially telescoped completely blocking the Main Line and resulting in damage to rolling stock and permanentway amounting to approximately Rs. 20,000 and Rs. 2,000, respectively. There were no casualties. The engine with the leading vehicle and the last nine vehicles including the rear brakevan were not derailed with the exception of one bogie timber wagon (No. 1014 W. B.) loaded with teak logs. All derailed vehicles were four wheeled goods wagons, loaded as under :—

10 loaded rice.
4 loaded miscellaneous goods.
1 loaded oil-cakes.
1 loaded 7 baskets of fowls.
1 empty.

The break down train arrived at 7 hours on 19th March 1930 and the line was cleared and through traffic restored at 22-30 hours on 20th March 1930.

Description of the locality of the accident.

4. The accident occurred at mile 118|15 on the Rangoon-Prome line, about 2½ miles north of Zigon Station where the line is on a low bank and is straight and level, *level* being preceded by a rising grade of 1 in 506 which terminates close to the point where the wheel mounted the rail; so that the derailment occurred practically at the change of grade.

Conclusions.

5. After inspecting the site of the accident and considering the evidence it is my opinion that the derailment was the result of bad loading combined with defective track, the primary cause probably being the defective loading of the bogie timber truck No. W. B. 1014, as the defects in the track were not so serious as to be likely to cause a derailment themselves but undoubtedly contributed towards that result.

Reasons for conclusion.

6. From the evidence it is seen that before the accident occurred the last station at which shunting was done was Thegon, where 4 covered goods and the bogie timber truck No. 1014 W. B. loaded with teak logs were attached. From the sketch accompanying this report it can be seen that some short logs were loaded on the floor of the truck and long logs above them. None of the logs were particularly straight or even, so that in the event of the truck undergoing any considerable jolting, there was a possibility of the logs shifting sufficiently to cause the lashing chains to become slack. However, when the train left Thegon apparently everything was all right. The Station Master and the Guard were satisfied that the lashing chains were tight and that the load was secure. The train proceeded on its journey and halted at the following stations :—

Padigon, Paungde and Nattalin,

where apparently nothing wrong was noticed, and so, in the absence of any evidence to the contrary, we must assume that the train left Nattalin for Zigon in good order and some reason must be sought for the load having subsequently shifted.

It was admitted in evidence that the road between miles 119 and 120 is rough owing to the fact that in this length certain bridge openings have been filled in which have not yet become fully consolidated and it is my opinion that while the train was travelling over mile 120—119, oscillation was set up in the truck which caused the logs to start moving and this motion probably continued right up to the time of the accident as an examination of the track for a length of two telegraph posts showed the gauge to be varying from 1|16-in. tight to 1|8-in. slack. There are also 18 inches of creep which would also tend to maintain a rolling motion in the vehicles.

What I think occurred is this :—The logs did not fall off the truck but slipped forward until they were pressing against the back of the wagon in front causing its right trailing wheel to bend against the rail until it mounted and was derailed, running for some distance on the sleepers. Until shortly afterwards, when the bogie timber truck derailed to the right, forcing the wagon round at right angles to the track and causing it to pull off to the left two vehicles ahead of it, whilst the vehicles behind the timber truck were telescoped into it.

The state of the track.—In the vicinity of the accident the track although not in first class order was not so bad as to call for drastic speed reductions.

The Gauge varies in places as much as from 1|16-inch tight to 1|8-inch slack in a rail length. The greatest error in cross levels, 7|16-inch, is not very serious as it did not vary from side to side, the track having a continuous slight cant to the left.

Sleeper renewals for the year have not been completed owing to some of the sleepers being used as cribs in renewing bridges and there are still some 10 per cent of bad sleepers in the road and a considerable number of loose dog spikes but there were no signs of the gauge having spread.

The ballast is shingle—mostly small smooth pebbles and it is difficult to keep the cross levels correct with this ballast as it shoots out from under the sleepers. The only way to prevent this would be to provide box walls of large stones or laterite blocks.

I have in another report recommended that in the future broken stone ballast be provided for this section.

There are about 18-inches of creep and this should be corrected.

The speed allowed on the section is :—

35 miles per hour for vacuum braked trains.

30 miles per hour for all others.

I have imposed a speed restriction of 25 miles per hour for all trains between Zigon and Nattalin.

Rolling stock.—The condition of the rolling stock so far as could be ascertained after the accident was good. There were no sharp flanges or loose axles, and wheels were correct to gauge and the accident cannot be ascribed to any defect in the rolling stock.

The evidence.

7. A letter from the District Engineer, Lower District to the Chief Engineer describes the state of affairs as he found them at 7|30 hours on the morning after the accident. I cannot agree with his remark that the only function of dogspikes is to maintain the rails to gauge and not to hold the rails on to the sleepers ; both functions are essential to a first class road.

I do not agree with his opinion that the W. B. timber truck was the first to derail for the reason that it could not have travelled in a derailed condition for a distance of nearly three telegraph posts without losing a large number of logs. On the contrary being a heavy vehicle, heavily loaded, as soon as it derailed it came to a stand and that accounted for the trucks behind telescoping into it.

The evidence of Brindley, the driver of the train was not very satisfactory and although he made unnecessary misstatements with regard to the placing of detonators on the line for the protection of his train and also with regard to the coupling of the vacuum hosepipes on the leading vehicles, I think we must accept his statement that he was travelling at about 25 miles per hour because the record of his journey maintained on the Controllers Chart showed his average speed after leaving Thegon Station, where he picked up his last load, was about 18 miles per hour only; and, if the time of the accident as given by himself and the guard was correct, he was only travelling at about 15 miles per hour and although two witnesses stated that the train was travelling very fast, I do not think I should be justified in saying the speed was excessive.

The remaining evidence does not call for any particular comments.

Recommendations.

8. Careful supervision in the loading of timber wagons.

The substitution of broken stone ballast for the existing shingle ballast as it is very difficult to maintain a good road with the latter.

In mile 119—120 where the rough road is due to the filling in of old bridge openings, the openings should be dug out and filled with laterite or kankar and rammed in layers.

The speedy completion of sleeper renewals.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into Accidents

which occurred during the

Half-year ending the 30th September 1930

No. 8

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NORTH WESTERN RAILWAY.

61 UP MAIL RUNNING INTO A BULLOCK CART AT LEVEL CROSSING No. 70 AT THE UP FACING POINTS, KARNAL, ON 12TH APRIL 1930.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. T.|14, DATED THE 26TH APRIL 1930.

In accordance with paragraph 8 of Notification No. 1926-T., dated 19th March 1930, I submit a report on an enquiry I held at Karnal, on the 16th April concerning a collision between 61 Up Mail and a bullock cart that occurred about 4-30 hours on the 12th instant at level crossing No. 70, mile 75|19.

2. The Assistant Officers of the Delhi Division of the North Western Railway were present. The Police and Magistrate were not represented although advised of the holding of the enquiry.

Description of the Accident.

3. At about 4-30 hours, 61 Up Howrah-Kalka Mail train, running about 3 hours late, ran into a bullock cart at level crossing No. 70, mile 75|19, at the up facing points of Karnal station yard on the Delhi-Umballa-Kalka section of the North Western Railway. The cart was struck full in the centre ; the cart driver was flung up on to the plate in front of the smoke box of the engine and carried on. The two bullocks were not injured in any way.

4. The cart driver was seriously injured and was subsequently removed to hospital for attention.

Description of the Locality of the Accident.

5. The accident occurred at level crossing No. 70, mile 75|19, of the Delhi Umballa-Kalka section of the North Western Railway. The Pucca Road from Kaithal to Karnal crosses the railway at this crossing just outside the up facing points of Karnal Station. Enquiries seem to show that the road is a busy one during the day and at night there is generally some traffic.

6. The line is straight and the crossing square. Two gatemen are maintained, but with a single unit gate lodge for their accommodation. The track is protected by gates on each side, not connected with each other and not locked with signals. The gates can be chained and locked but the locks are not riveted to the chains and so can be used by the gatemen for locking their quarters and for their private use. Two gate lamps are provided, one on each side of the track. The two lamps are of different types ; one has 4 lenses (2 red and 2 white) fitted in a bracket, with a pin to insure correct setting. The pin was missing and the light was so fixed at the time of my inspection as to give wrong indications. The other lamp has only one red lens showing either to road or railway.

7. The weather was clear and the view is unobstructed for both road and railway.

8. The gatemen are under the orders of the Station Master Karnal who produced a register showing their duty hours as being 6 hours "off" and 6 hours "on" duty. This register was in my opinion filled up and completed after the accident, but the duty hours were so arranged.

The Evidence.

9. Admitted facts are that the gates were not chained and locked but were open or sufficiently open to permit a cart to cross the track and that, in attempting to cross, this cart was struck by 61 Up Mail. It would appear that the gate lights were correctly lighted but no gateman was present and so one of the two gatemen failed in his duty and is responsible for the accident.

10. Of the two gatemen, Nawazish and Nazir Ali, each claims that the other was supposed to be on duty. Nazir Ali points to the station master's register of duty hours which gives his hours as 6 to 12 and 18 to 24. Nawazish admits that these were the hours set for Nazir Ali but as he himself has a family, no quarters at the station and lives in the city, whereas Nazir Ali is a bachelor and occupies the gate lodge, by agreement with Nazir Ali and without

the knowledge of the station master, Nazir Ali did all night duty from 18 to 6 hours and Nawazish took day duty from 6 to 18 hours. This story of their private arrangement is supported by Mithwa, gateman 71, who, till the 1st April, shared the charge of gate lodge No. 70 with Nawazish and worked to these hours. Mithwa appeared to be one of the only two really truthful witnesses.

Conclusions.

11. I am of opinion that the accident was caused by

(1) the gates having only been chained and not padlocked and so left for the night by the gateman in charge.

(2) the cartman or, as this man was apparently asleep on top of his cart when he was struck, some other cartman previously had opened the gates for himself and passed through.

12. I am further of opinion that Nazir Ali gateman had accepted the arrangement that he would take duty from 18 to 6 hours, was supposed to be on duty at the time of the accident and is responsible for it. This is based on

(1) the statement of Mithwa as to his arrangement with Nawazish ; and a newly appointed gateman like Nazir Ali was not likely to object to an arrangement of this sort and probably was unaware that there were any orders allotting other hours.

(2) the condition of Nazir Ali when the accident occurred, his tears, etc., I cannot imagine him to be so affected if somebody else were to suffer for it.

(3) the story Nazir Ali gave the driver, guard, etc., immediately after the accident and before he had had time to learn that, officially, he was not supposed to be on duty. This story was that the cartman had beaten him and compelled him to open the gate — the first excuse that came to him, but accepting the fact that he was on duty.

(4) the fact that Nawazish lived in the city with his family and 6 hours off duty would hardly suit him to get home, eat a meal, have a proper rest and get back to the gate lodge.

13. Driver Smith admits that he saw the cart before he struck it and applied his brakes. He was then almost on the facing points, the turn-out of which he was supposed to be taking at 10 miles per hour, and he claims that his speed was 10 or 12 miles per hour. Yet he ran 700 ft. before he pulled up his train of 8 bogies fully vacuumed.

The Station Master Hazur Singh helped to confuse the issue with his false register of duty hours for the gatemen.

14. A copy of this report is being sent to the District Magistrate, Karnal, and the Assistant Inspector General, Railway Police, Lahore, for any action they may deem necessary.

Medical Relief.

15. The train staff were prompt in looking for the injured cartman when the train came to a stand, but it is fortunate that the vacuum hose pipe was damaged when the collision occurred or they would not have found him. Having found him, prompt action was taken to get him to the civil hospital, Karnal, and under efficient medical attention. The guard of this important train had no first aid equipment though he was qualified to render first aid.

Recommendations.

16. (*a*) It is my opinion that gatemen should be compelled to occupy their lodges and the supervising staff of the Railway should see that it is done.

(*b*) The padlocks should be riveted to the chains on the gates.

(*c*) The gate lamps should so fit their brackets that there is no possibility of error in setting them up.

(*d*) The advisability of locking the gates of this crossing with the up home and down starter signals of Karnal should be considered by the Administration.

(*e*) The provision of first aid equipment on important passenger trains should be expedited. For foreign line rakes, as in this case, spare equipment should be kept at junctions.

SOUTH INDIAN RAILWAY.

335 SHUTTLE MIXED RUNNING INTO A BULLOCK CART AT A LEVEL CROSSING BETWEEN PALGHAT AND OLAVAKKOT, ON THE 19TH APRIL 1930.

FROM MR. H. DALE GREEN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 7, OOTACAMUND, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. S.-30|185, DATED THE 30TH JUNE 1930.

As ordered in Railway Board's Endorsement No. 3180-T., dated 9th October 1929, I have the honour to submit my report on the above.

At 5|17 hours on 19th April 1930, No. 335 Shuttle Mixed from Palghat to Olavakkot, South Indian Railway, Broad Gauge, collided with the level crossing gate at the Palghat end of the combined rail and road bridge over the Kalpathi river at mile 333|2-4, smashing the gate and colliding with two bullock carts.

Two bulls were killed, the other two bulls and one cartman were seriously injured, one cart was smashed to pieces and the other damaged. The other cartman escaped unhurt. The engine and the first vehicle behind it were damaged slightly. No passengers were hurt.

The engine had no electric head-light.

2. The level crossing at which the accident occurred is a 'B' class level crossing on a skew.

The bridge is protected by gates and gate signals at either end. These gates and the signals are so connected that the signals cannot be lowered unless both the gates are closed against road traffic. Indicators are also provided in the Station Masters' offices at the adjoining stations (Palghat and Olavakkot) in both directions showing when the gates are closed, and the rules require that Station Masters, before handing over the line clear tokens to the drivers, must satisfy themselves by means of the indicators that the gates are closed against the road and open for the railway.

In this case the station master, Palghat, failed to observe the above rule, and the driver of the train concerned failed to notice the gate signal at danger sufficiently early. The Station Master, Palghat, and the driver of the train are both to blame for the accident.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

No. 20 UP PUNJAB-BOMBAY EXPRESS RUNNING INTO A BULLOCK CART AT LEVEL CROSSING No. 55, BETWEEN VANGAON AND BOISAR ON 25TH APRIL 1930.

FROM MR. G. W. N. ROSE, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1023 OF 1930, DATED THE 16TH MAY 1930.

In accordance with rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith the report of my inquiry into the above described accident, held at Vangaon station on 3rd May 1930.

2. Mr. A. E. Watkins, Executive Engineer, Mr. P. S. Clarke, M.C., District Traffic Superintendent and Mr. A. G. J. O'Sullivan, District Locomotive Superintendent, Bulsar, attended the inquiry, as well as the Sub-Inspector, Government Railway Police, Bulsar.

Description of Accident.

3. At about 3-17 hours on the morning of the 25th April 1930, No. 20 Up Punjab-Bombay Express (south-bound) ran into a bullock cart on level crossing No. 55, mile 69|23, just south of Vangaon station, killing the cart driver and both oxen. Slight damage was done to the right side cylinder cock and to the cattle guard of the engine.

Description of Locality.

4. Level crossing No. 55 is situated 350 yards to the south of the up starter of Vangaon and 185 yards south of the down outer. It is square to the line and has single-leaf gates opening outwards ; the gate lodge is east of the line and south of the crossing. Formation is little above ground level. Both gates have lamps showing red and white in the standard manner, and the gates are fastened with bolts, which are provided with padlocks. All were found in good order on the date of my inquiry. Culvert No. 160 is about 245 yards to the south of the crossing.

5. The line to the north is straight through Vangaon station, and for several miles beyond, and there is nothing to impair the visibility of the headlight of an approaching train.

Circumstances of the Accident.

6. The level crossing was manned by Govind Bendia, gateman, whose duty hours were from 18-00 to 6-00, and by Kamali Govind, gatekeeper, his wife, whose hours were from 6-00 to 18-00. the former being on duty at the time of the accident. The 22-35 down goods train passed the crossing at 3-5 hours, *i.e.*, about 12 minutes before the accident, and according to his own statement, Govind then opened the gates to pass some 5 carts from west to east. He then closed the west gate, but without bolting it, and crossed the line and was closing the east gate, when the deceased cartman opened the west gate and brought his cart into the line, in spite of Govind's protests. At that moment 20 Up reached the spot and crashed into the cart, smashing it and carrying the cartman's body some 20 yards down the track.

7. Driver Roberts of the Express states that he had dimmed his headlight three quarters of a mile before reaching the station, and that he had seen nothing on the track, when a sudden blow of steam from his engine on the crossing caused him to pull up. Ashes on the track show that the train stopped with the engine 1,600 feet away from the crossing, the train length being about 600 feet. Roberts found on examination that the engine had apparently run into some cattle. He sent his fireman back along the train to make a search, which he did in conjunction with the guard, Smith, but without finding anything or seeing any signs of an accident. Neither man went back as far as the level crossing in rear, although the engine crew knew that the accident had been on a level crossing. The train then started for Palghat, its next stop, where the train staff sent back a message to Vangaon for both tracks to be examined before another train was passed.

8. In the meantime Govind had reported the accident to Mr. M. Pandian, Sub-Inspector of Permanent Way, at the latter's quarter in the station yard, about one third of a mile from the gate. Mr. Pandian went out to the crossing

at about 4-05 hours, where he found both gates locked, and both lamps burning. He cleared the line and ordered a resumption of traffic.

Comment on the Evidence.

9. At least half an hour elapsed between the time of the accident, and the time at which Govind reported to Mr. Pandian and Govind explains this by an account of how he caught and tied up the cattle of two other carts which crossed the line in culvert No. 160, so that he might have their drivers as witnesses of the accident. The cattle were left in charge of his wife, and were released by their owners as soon as he himself left the spot. His wife corroborates his whole statement in detail, except for an important discrepancy in the number of cattle said to have been tied up. Two Forest Department men who were on night duty at a neighbouring Forest post, corroborate his statement as regards having heard shouting to a cart not to come in, but their evidence was not brought forward at the Police inquiry immediately after the accident, and it is very unconvincing.

10. The train staff when they halted saw no signs of lights being carried or other activity at the crossing in rear of them, and it is very doubtful whether Govind was as much on the alert as his statement would imply. There is little available evidence, apart from Govind's, to show whether the gates were closed or open, or whether the lamps were burning ; it is probable that the lamps were lit, and the gates closed. It is certain, however, that the west side gate was not padlocked, as required by the rules, and that Govind, even if present, as he himself states, did not display reasonable care in observing the approach of 20 Up and in protecting his crossing against it.

Finding.

11. I find that the deceased was primarily responsible for the accident in that he entered the crossing, having in all probability opened a gate to do so, at a time when very little care would have brought the approaching train to his notice, even with the headlight dimmed as it was.

12. Govind, gateman, is responsible for his breach of Subsidiary Rule 229 in not locking the gate, and of General Rule 229 (*a*) in not being on the alert to protect his crossing as 20 Up approached, and I recommend that he be dealt with departmentally.

13. Driver Roberts, I consider, failed in his duty in that though he knew he had struck something on a level crossing, he did not specifically instruct his fireman to go back to the crossing.

There is no evidence to show that Guard Smith knew that the accident had occurred on a crossing and he can hardly be blamed for not going a greater distance back from the train.

Concluding Remarks.

14. This case brings to notice four points :—

(*i*) The crews of two engines failed to notice the lamps on the crossing gates, whether lit or not. If, as there is no reason to doubt, they were duly burning, one gate at the time of this accident must have been showing a red light to 20 Up, which entirely escaped the notice of the crew.

It must be impressed on all drivers that a red light, wherever and however shown, is a danger signal, to receive immediate attention, and in my opinion, drivers should know their road sufficiently well to recognise and pick up the lights of all level crossings having lamps, as they meet them.

(*ii*) The risk of this accident would have been very greatly reduced if the electric headlight had not been dimmed for more than a mile before the site of the accident, in accordance with Subsidiary Rule 143 in force on Bombay, Baroda and Central India Railway*. The necessity for this special provision, so much beyond the requirements of General Rule 143, should be reconsidered by the Administration.

(*iii*) In this case husband and wife shared turns of duty at a gate lodge. I do not think that this is a satisfactory arrangement. In my opinion any crossing with sufficient traffic to require manning with

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*Headlight to be dimmed for ¾ mile before and ¾ mile after every station.

more than one relief, should be manned by men only. The arrangement of husband and wife is likely to lead to irregular hours of relief being worked to, and in such a state of affairs the wife is unlikely to bring this to the notice of her superiors.

(*iv*) An examination of the train signal register relating to 20 Up Express at Vangaon shows the entry for its arrival at the next station, Boisar, to have been erased and overwritten as 3-40, the correct time. It seems probable that an entry was made originally, prior to the receipt of the actual " in-report " from Boisar of the delayed timing of 3-40. If so, a highly dangerous irregularity of working took place.

BURMA RAILWAYS.

DERAILMENT OF 44 DOWN LOCAL AT MILE 53|10 ON RANGOON—MANDALAY LINE BETWEEN PAYAGYI AND SHWEHLE ON 5TH MAY 1930.

FROM MR. R. HATT-COOK, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE, No. 2-A., BURMA, TO THE SECRETARY, RAILWAY BOARD, DATED THE 12TH MAY 1930.

In accordance with Rules 9 (2) and 18 (1) (*c*) of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I did not hold an enquiry in connection with the derailment of 44 Down Local at mile 53|10, but submit this report on the earthquake at Pegu on 5th May 1930, causing the derailment of 44 Down Local at mile 53|10 on Rangoon-Mandalay line between Payagyi and Shwehle.

Description of the Accident.

At about 20.25 hours on 5th May 1930, 44 Down, Engine tender, water tank, brake (4 wheeler) and one bogie coach were derailed at mile 53|10, the engine with the tender turned completely over on its side on the left hand of the down track, also the water tank and four wheel brake. A 3rd class bogie was derailed on the right side of the down track, heeling over at an angle of about 45 degrees.

Driver Ross was badly scalded and cut over the temple. He was sent to Rangoon General Hospital next day. One fireman was killed outright, he was found lying under the tender. The second fireman was slightly injured. No casualties to passengers were reported. These comprise the total casualties.

44 Down was running to time and would have passed the spot of derailment, *i.e.*, mile 53|10 at about 20.25 hours. A slight earthquake was felt at Payagyi by the guard and station staff when 44 Down was about to leave, *i.e.*, 20.18 hours. Two shocks actually occurred, the first slight, then the big one a few minutes later. It appears therefore that 44 Down ran into the zone of the earthquake. The line being badly buckled at the site of derailment consequently there is no doubt as to the cause of the accident.

It is interesting to note that the Station Master's clock (Pegu) stopped at 20.18½ hours (he said it was correct time that morning), and that of Payagyi at 20.15 hours.

Several bridges were damaged especially the large bridges over the Pegu River. There were many earth fissures along side the line between Payagyi and Shwehle and the line was badly buckled in several places the rails being bent " U " shape.

Both Up and Down lines were blocked from the time of the earthquake until about 19.23 hours on 7th May 1930 when 2 Down was passed over the Up line between Payagyi and Shwehle.

I questioned Ross the driver of 44 Down in Hospital on 9th morning on certain points and he appeared weak and un-nerved ; the result of this is as follows :—

He was on the look out all the time and saw the buckle in view of the head lights about 100 yards ahead. He put on the steam and vacuum brakes at once but there was no time to stop the train. He judged his speed to be about 15 miles per hour at the site of derailment. The vacuum brake was in order.

The road was straight. The earthquake caused the derailment.

The head lights were burning brightly, and he stated he could usually see about 100 yards ahead clearly.

Both firemen were working at the time.

All three of the engine crew felt earth tremors at Payagyi.

The train was running to time. After the derailment, the guard walked ahead to Shwehle with the driver, the guard showing a danger signal towards 3 Up which was due.

I also questioned the Guard of 44 Down at Rangoon on 12th morning the result of this is as follows :—

44 Down arrived Payagyi at 20.16 hours and left right time.

He felt a heavy shock on the platform as did the rest of the station staff also.

The train travelled quite smoothly at about 30 miles per hour up to the place of the accident, when he felt a slight shock as if pulling up and the vacuum went to zero. He was travelling about 20 miles per hour ; just before the vacuum went to zero the train seemed to stop almost at once. He then ran to engine. All passengers alighted. He then protected his train both sides with red signal lamp and detonator in rear and with the aid of a gangman in front.

He then ran to Shwehle with the driver following, and shewing a red signal towards 3 Up which was due. He informed Station Master Shwehle to block both lines due to accident. He then immediately returned from Shwehle. He protected his train till relief came. The Assistant Permanent Way Inspector came to the site of the accident at 22.0 hours and he asked him to take Driver to Pegu as he was going that way to inspect the line. He saw later the 2nd fireman under the tender dead. The first fireman was looked after by a Phongyi until morning when he sent him by trolly to Payagyi.

There were only about 15 passengers in the train. They dispersed to the local villages. He asked them if they were hurt, they all said no.

A gang hut was just close. He noticed while protecting his train the line in front of the train was twisted in the rear it was straight and along the train also it was straight. at the site of the track it was broken and twisted towards the direction of the engine.

He had first aid equipment in his brake. He rendered no first aid to the driver as the latter said it was not necessary to be bandaged but just send him to Hospital. He gave him water and station staff helped him to the station when he could go no further.

The head lights were burning brightly.

The composition of the train was as follows :—

6 bogies including Bogie Brake Third and Bogies First and Second, one Luggage Van, 1 Water Tank.

I would also add that 3 Up Mail had left Pegu and was proceeding slowly towards Shweble covering a distance of about 800 yards when the earthquake was felt and the driver decided it was unsafe. He then stopped the train and it was seen that Pegu Town was on fire. A pilot was then sent for to take his train back to Pegu.

The Administration are to be highly commended for the promptitude with which through traffic was resumed.

BENGAL NAGPUR RAILWAY.

207 DOWN GOODS TRAIN RUNNING INTO A BULLOCK CART AT A LEVEL CROSSING AT MILE 516|11 BETWEEN KORUKONDA AND ALAMANDA STATIONS ON THE HOWRAH WALTAIR SECTION ON 9TH MAY 1930.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 1433|XIII|30, DATED THE 22ND JULY 1930.

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit my report on the accident which occurred at the Level Crossing at Mile 516|11 on the Howrah-Waltair Section of the Bengal Nagpur Railway on the 9th May 1930.

2. A Senior Officers' enquiry was held on 17th May 1930, the evidence recorded thereat was accepted by me ; I held an enquiry on 21st June 1930 and the site of the accident was visited the same day.

Description of the Accident.

3. On 9th May 1930, at about 22|40 hours, while 207 Down Goods was proceeding from Waltair to Vizianagram, with a load of 58 = 700 tons, it collided with a bullock cart at the Level Crossing, Mile 516|11, between Alamanda and Korukonda. There were five persons on the cart, one was killed and the others injured ; one bullock was hurt and subsequently died and the cart was badly damaged. The engine was fitted with an electric searchlight and the vacuum brake was in order.

Description of the Locality of the Accident.

4. The village road over the crossing is a metalled one to Vizianagram and a census of daily road traffic gave the following result :—

Motors	..	..	..	2 By day.
Carts &c.	..	..	....	98 ¼ by day, ¾ by night.
Cattle	..	..	..	Occasional herds by day.

On Saturday and Sunday there is an appreciable increase in cart traffic owing to local markets being held. Eighteen trains run bothways during the 24 hours.

5. Approaching by rail from Howrah, the East side of the road is open, the west side is obscured by the gate lodge and trees ; these conditions prevail to within 700 ft. of the crossing beyond which the through girders of a 5-100 feet bridge obscure the view almost entirely. From the Waltair end, both sides of the road are open.

Approaching by road from the East, the view of the track bothways is open, from the west the Howrah side is obscured by trees, the Waltair side is open. Though the girders of the bridge shut out the view of the track to both sides of the road for some 500 feet, the increased sound of the train while on the girders however compensates for the loss of range of view. From Waltair, the track is on an up grade of 1 in 800 to within 423 ft. of the crossing, whence it runs level for 1,600 feet and then down at 1 in 300.

The road approaches are graded up to the crossing at 1 in 28 and 1 in 33 on the east and west approaches respectively.

6. Drizzling rain was falling when the accident occurred and visibility was not too good.

The crossing was in fair order, has single leaf 15 ft. gates painted white and swinging outwards ; white discs 18″ diameter are affixed near the top with "STOP" painted on them ; these discs are illuminated by reflection from oil lamps fixed at the edge of the road on posts 3 ft. high, 20 ft. from the centre of the track and 3 ft. below the level of the discs ; the lamps have 3″ diameter lenses with plated reflectors, practically the entire plating was worn off the arrangement known as a "Coronation" lamp. No indication is given to drivers as to the position of the gates. By actual test at night I found one could see nothing of the disc from 100 ft., at 50 ft. a dim view was obtained and at 25 ft. it was clearly discernible.

Conclusions.

7. Gateman Mutyalu states he closed the gates but did not padlock them. Guard Anthony declares the east gate was open and the west one closed, how far this is correct may be gauged from the fact that the cart came through the west gate ; Driver Juggiah states both gates were open. These conflicting statements show how little reliance can be placed on the evidence regarding gates.

Gateman Mutyalu makes no complaint of the cartman forcing his way through or of being prevented from closing the gates and as the cart entered the Level Crossing, it is obvious that the west gate was open. His duty as regards gates is clearly laid down in General Rule 229 and as the night was a stormy one he should have taken greater precaution ; he had the added advantage of the engine search light to warn him of the approach of the train and I cannot believe, if he had been awake at the time, that he would not have closed the gates. He is entirely responsible for the accident and for a breach of rules, he was not a straightforward witness and made contradictory statements to the Police to absolve himself.

The only extenuating circumstance in his favour is that he was single handed and doing 24 hours' duty. It is not fair to any man to expect him to work under such conditions and it is not surprising he fell asleep ; there is no excuse, however, for him leaving the gates open.

8. Cartman P. Appalaswamy admits he fell asleep and left the bullocks to wend their way along, this is corroborated by Farmer B. Ayyanna one of his passengers. It is incumbent on cartmen crossing railways to exercise at least as much caution as an ordinary person does when coming on to a main road from a side one and as the beam of the engine searchlight gives ample warning to road users he is to blame for not keeping awake and alert.

9. The train driver Juggiah admits he could see a distance of about 900 ft., the beam of the searchlight illuminates sideways for at least 50 ft. and he should have been able to see that the west gate was open, it stands out prominently against the gate lodge as a background ; if he had been alert he should have seen the cart approaching, especially as it was roofed over with a light coloured mat covering. It is true he has the right of way but this does not mean he should not exercise caution and that he is at liberty to take it for granted everything is clear for him. Searchlights have been provided with a purpose and it is up to drivers to make use of the facilities afforded them for spotting obstructions.

He was on an upgrade when the crossing came into view and if he had been vigilant and cautious he should have been able to pull up before reaching the crossing in spite of the rails being wet ; normally at a speed of 20-25 miles per hour he should have pulled up in some 600 feet ; he admits to seeing the cart from 220 feet and he ran for some 220 feet after striking the cart. This, coupled with his admission of being able to see for 900 feet, clearly shows he was negligent in driving.

Recommendations.

10. The question of providing suitable gate lamps in place of the existing ones at crossings with a fair amount of traffic appears an urgent matter.

11. A fixed signal on the track beyond the bridge where the girders obscure the range of view should also be erected at this crossing.

12. Some relief must be afforded the gateman as regards hours of duty, the traffic scarcely warrants a second man and the civil authorities might be approached with a view to stopping road traffic for say 6-8 hours during the night.

13. Conditions in India are rapidly changing and it seems to me questions 19 and 20, Form IX, Rules for the Opening of a Railway, should be re-cast more or less on the lines of Clause 28, Level Crossings of the Ministry of Transport Requirements for Passenger Lines.

BENGAL AND NORTH-WESTERN RAILWAY.

DERAILMENT OF 1 UP EXPRESS TRAIN AT MILE 87|2, BETWEEN SAHEBPUR KAMAL JN. AND LAKHMINIA STATIONS, ON 26TH MAY 1930.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 141-T., DATED THE 4TH JUNE 1930.

In accordance with Rule 8 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I beg to submit a report on the enquiry held by me into the circumstances attending the derailment of No. 1 Up B. and N. W. Railway Express train at mile 87|2, between Sahebpur Kamal Junction and Lakhminia stations on the main line on the 26th May 1930.

2. I held the enquiry on June 2nd, 1930, at Sahebpur Kamal station. The following officers were present while I recorded all evidence.—

Mr. A. Robb ..	..	Dist. Loco. Superintendent, B. and N. W. Ry.
Mr. G. M. Beveridge	..	Resident Engineer, B. and N. W. Ry.
Mr. M. G. Morgan	..	Dist. Traffic Superintendent, B. and N. W. Ry.
Mr. Ayyar ..	..	Sub-Divisional Officer.
Mr. P. K. Mitter	..	Asstt. Superintendent Police.

Description of the Accident.

3. On 26th May 1930, at about 19.5 hrs., No. 1. Up Express while proceeding from Sahebpur Kamal to Lakhminia at mile 87|2 was struck by a severe cyclone which caused the entire train to be derailed and all, except one bogie vehicle to be overturned. One passenger and engine khallasi were killed and four passengers, the driver, fireman and Asstt. Guard were injured. One injured passenger subsequently died in hospital.

4. The total damage to rolling stock amounted to about Rs. 21,500. The damage to Permanent-Way was negligible.

5. A relief train arrived at the site from Barauni at about 22.30 and one from Sonepore at 4 hours next morning. With the former train were one Railway Assistant Surgeon and a District Board Assistant Surgeon who attended to the injured at site. Some of the slightly injured who had made their way to Sahebpur Kamal station were attended to there by the Assistant Surgeon from Khagaria who arrived at that station by 5 Up at about 22.30.

6. The injured were taken by the Barauni Relief train to Begu Sarai, where they were placed in the Railway Hospital.

7. The line was cleared at 15 hours on 27th May.

Description of the Locality of Accident.

8. The line at the site of the accident is straight on a 12 to 15 feet bank. The track was well maintained and the gauge was checked at several points near the site and found correct. There are no trees near the line.

Conclusions.

9. The accident was due solely to the force of the wind. The track was in good order, there were no obstructions, the train was travelling at a reasonable speed and the driver had applied his brakes and almost brought the train to a stand before it overturned.

Relief was sent out promptly from Barauni Junction and the injured were promptly attended to and taken to hospital when the relief train arrived.

10. There was no first aid box or medical equipment of any sort on the train, nor at Sahebpur Kamal station. In view of Railway Board's Circular No. 2673-T., dated 29th January 1930, I consider that by this time arrangements should have been made for medical equipment on Express Passenger trains.

11. The relief work was greatly hampered by darkness. All the electric train lights went out and no hand lamps were available on the train.

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DARJEELING HIMALAYAN RAILWAY.

COLLISION NEAR MILE 29½, BETWEEN 2 DOWN MAIL AND RETURNING EMPTY RAKE OF 4 DOWN MIXED, ON 24TH JUNE 1930.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 698, DATED THE 9TH JULY 1930.

In accordance with Rules 8 and 9 of the Rules for reporting accidents published under Notification No. 1926-T., dated 19th March 1930, I have the honour to state that I enquired into the above accident on the 27th and 28th June 1930 (making a supplementary enquiry on 6th and 7th July 1930) and to submit my report below. I was assisted at the enquiry on the 28th June by the Senior Departmental Officers of the Railway.

Description of the accident.

On the night of the 23rd—24th June 1930 a land-slip occurred near Bridge No. 198 at about Mile 28¾ between Mahanadi (Mile 27⅛) and Kurseong (Mile 31¼), necessitating the transhipment of trains. At 15-54 hours, 4 Down mixed train had been sent out from Kurseong with the engine in rear to the slip. At about 17-10 hours, 2 Down, also engine in rear, was despatched to the slip from Kurseong, and collided violently with the returning stock of 4 Down near Mile 29½, on a blind curve. The composition of 2 Down in order of precedence was :—

	Weight, approximately mds.
4-wheeler Parcels Van No. 777	100
Bogie Parcels and III Class No. 82	150
Bogie First Class No. 651	150
Bogie Second Class No. 662	150
Bogie Mail Van No. 660	150
Engine No. 47 B	380
Total ..	1,080 mds.

Parcels Van No. 777 received the blow from the Engine No. 34-B. of 4 Down returning rake. The weight of 4 Down engine and rake was approximately 870 mds. The rear of 777 and the forward end of 82 appear then to have momentarily lifted together by the impact. The buffer of 777 then slipped above that of 82 and 777 was forced on to the frame of 82, domolishing the III Class compartment that was leading and staving in the partition between the III Class and the Parcels compartments.

The leading III Class compartment was full of passengers and, of the 22 persons injured, nearly all were travelling in this compartment. The brakesman riding between 82 and 651 had both his legs crushed and was pushed into the leading compartment of 651. In the remainder of the train only one casualty occurred, caused, it is stated, by the fall of a box from a luggage rack on the head of the victim.

Description of the Locality.

At the point of collision, the track runs due N. N. E. in the down direction, from Kurseong to Mahanadi. In the Down direction, beginning near Mile 29½, the line makes a leftward sweep for about a quarter of a mile round a high hill, during the circling of which trains on this quarter mile would not be visible to each other. The cart road which is on the same level as the Railway runs between the railway and a deep valley. The grades in this quarter mile are 4.13 per cent. for 300 feet, 3.25 per cent. for 500 feet and 2.35 per cent. for 300 feet, all downwards, in the down direction. The trains met about the middle of the 3.25 per cent. gradient. Owing to the hill the visibility in the Down direction at this point was limited to about 55 yards and in the Up direction to about 25 yards.

The weather had been rainy and misty, but there was no rain and the mist had cleared when the trains met.

Evidence.

4 Down mixed train left Kurseong for Mile 28¾, the site of the slip, at 15-54 hours on 24th June 1930. The Station Master, Kurseong, Babu B. D. Roy, issued the line clear which read as follows :—

To the Driver of No. 4 Down mixed train.

The line is clear and you are hereby authorised to proceed to Br. No. 198 and return to this following empty 2 Down Mail rake from there after transhipment of 2 Down Mail there.

Motilal, the Driver of 4 Down was illiterate and the orders on the line clear were explained to him by the Station Master in the presence of the Guard, Mr. W. Wallace.

The next train to go out to the slip was 2 Down Mail. The Station Master Babu B. D. Roy was going out with this train to the slip and preparatory to doing so went home to tea.

Babu B. D. Roy had not been away many minutes when the General Manager, Mr. R. N. Nicolls, who was on his way to the slip by car to watch the transhipping of 2 Down, looked in at the Station Master's office, Kurseong, and asked the Assistant Station Master, Babu Padam Lal Upadhya, who was there, about the whereabouts of 2 Down Mail and what the arrangements were for transhipping at the slip. Babu Padam Lal told him that 2 Down would go out on the return to Kurseong of 4 Down empty rake from the slip.

The General Manager then went down to the slip by car, and found that the empty rake of 4 Down had not been started. He met the District Traffic Superintendent, Mr. B. C. Craggs, and told him that the Assistant Station Master had told him that 2 Down would wait at Kurseong for the return of 4 Down empty rake, and said that the rake had better be sent back without delay.

The empty rake of 4 Down at that time had no Guard, for Guard Wallace had gone off with the train from the other side of the slip to Siliguri, and was in charge of Moti Lal, Driver. Mr. Craggs went up to the Driver, and told him to start at once as 2 Down Mail was waiting for him.

The evidence at this point is very conflicting, on the one hand Mr. Craggs states that Driver Moti Lal after attending to his engine asked him (Mr. Craggs) if he (the Driver) was to go to Kurseong and on Mr. Craggs' answering 'Yes' he (the Driver) called his staff, blew his whistle and started. Mr. Craggs did not ask the Driver for his Line Clear ticket as he had no reason to doubt the correctness of the information given to the General Manager by the Assistant Station Master, Kurseong. On the other hand, the Driver, Moti Lal, says, and his statement is corroborated by outsiders, that having had clear instructions from the Station Master, Kurseong, to stay at the slip, and follow the 2 Down Mail rake back to Kurseong, he dropped steam as there was a long wait for the Mail. But inside an hour Mr. Craggs ordered him to return to Kurseong as the Mail was being detained. He declared that he told the District Traffic Superintendent that the Station Master, Kurseong, had told him to wait at the slip for the Mail, but that the District Traffic Superintendent said that the General Manager had given other orders. He subsequently accepted the District Traffic Superintendent's order and started the train.

Meanwhile Babu B. D. Roy, Station Master, Kurseong, returned to the Station Master's office. Babu Padam Lal, Assistant Station Master told him that he had told the General Manager in answer to a question that the usual procedure is for 4 Down to come back before the Mail (2 Down) would leave. The station Master states he then asked the Assistant Station Master if the General Manager had advised him to detain the Mail at Kurseong and receiving an answer in the negative obtained line clear for 2 Down Mail from Mahanadi Station. When he was about to leave with the train he again asked Padam Lal if the General Manager had given any instructions and was again answered in the negative.

The trains appear to have proceeded cautiously, 2 Down more cautiously than 4 Down, for the former was pushing and the driver had to follow the signals of his Jamadar—Brakesman riding on the leading vehicle.

Near Mile 29½, Driver Thornton of 2 Down lost sight of his Jamadar and his flag at one moment and straining upwards to see if he could see him suddenly saw the Engine of 4 Down empty rake round the corner. Visibility here might be taken as 55 yards for him, and his train was about 45 yards long ahead of him ; there could, therefore, not have been much more than 10 yards between his leading carriage and the oncoming engine when he saw it. Consequently the collision then was unavoidable. The Driver of each train declares that he immediately reversed his engine and gave full steam. 2 Down was travelling down a grade of 1 in 30 and 4 Down up the same grade. The Driver of the former states he was travelling at 5 miles per hour and the latter states that he was doing not more than 7 miles per hour. At a combined speed of 12 miles an hour, 10 yards would be covered in under 2 seconds, quite insufficient time to act in. After the collision, 4 Down is said to have rolled down about 70 yards away from the position of the collision, 2 Down on the other hand could not move either way.

Conclusions.

The system of working the Main Line between Siliguri and Darjeeling of the Darjeeling Himalayan Railway is a combination of the Section Clear, Following Train and Pilot Guard systems. Allowing two or more trains travelling in the same direction on one section is normal rather than unusual. When an obstruction occurs on the line, work is done by line clear messages, but two trains may be allowed up to the obstruction on the same section from either side if the number of trains to be dealt with requires it. This working is not according to any written rules that can be traced but in accordance with the practice long established on the Railway.

The evidence shows that though sending two trains out, the second following the first after an interval of time, to the site of an obstruction, is not unusual, the interval of time, an hour and a quarter, that elapsed between the sending out of 4 Down and 2 Down from Kurseong on 24th June 1930 was quite unusual. The Station Master, B. D. Roy, who handled these trains admitted that the usual interval was 5 to 20 minutes.

Responsibility for the accident rests with several people but the most culpable is Babu Padam Lal Upadhiya, Assistant Station Master, Kurseong. The wrong information he gave the General Manager led up to the accident. It was in his power to rectify his error by making a clean breast of it to the Station Master and insisting that 2 Down be held back until 4 Down was communicated with, but he failed to rise to the occasion.

I do not think the General Manager, who was the unsuspecting carrier of incorrect information to the District Traffic Superintendent, is in any way to blame.

The District Traffic Superintendent, Mr. Craggs, cannot escape blame. The incorrect information passed on to him by the General Manager and the advice to start 4 Down at once, that rounded off the information, was not an order that he was obliged to obey blindly. It was not an executive order, for such orders are not received by him from the General Manager. He should have made certain that he was not giving an order that conflicted with the orders given by the Station Master, who alone orders the movement of trains, and that in writing. He relied too much on the accuracy of the information given by Babu Padam Lal and was let down. He was badly served also by Mr. Ellis. Assistant Traffic Superintendent, who having, at the time of departure of 4 Down from Kurseong, arranged with the Station Master, Kurseong, Babu B. D. Roy, the unusual procedure of sending a following train an hour and a quarter after the leading train, did not inform Mr. Craggs of the arrangement made. Mr. Ellis says he told the Guard of 4 Down, Mr. Wallace, to tell Mr. Craggs. This the Guard denies. This message should have been sent in writing, especially as the Guard of 4 Down was to go on to Siliguri after transhipping his train.

Driver Moti Lal, I consider blameworthy for not showing his line clear to Mr. Craggs who could not have ignored it. The line clear was his authority for being, and for his movements, on the section and in this case could only be superseded by another written order from a Station Master at Kurseong.

Station Master B. D. Roy took an unnecessary risk when he ignored the danger inherent in the wrong information given by Babu Padam Lal to the General Manager who was on his way to the slip. There was no telegraph but

there was a good road and there were cars at Kurseong and he should have acted for safety first. He knew that the officers would not knowingly supersede his orders on the line clear but that was insufficient to take a serious risk on.

Recommendation.

Rules based on General Rules for working Railways, should be drawn up by the Darjeeling Himalayan Railway Administration without delay, for the working of trains on sections that are obstructed, and sent to me for approval

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

DERAILMENT OF NO. 60 DOWN MIXED TRAIN AT MILE 51|3-5, BETWEEN SONASON AND HIMMATNAGAR STATIONS ON THE AHMEDABAD PRANTIJ BRANCH, ON 10TH JUNE 1930.

FROM MR. G. W. N. ROSE, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1281 OF 1930, DATED THE 3RD JULY 1930.

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith my report of the enquiry held by me at Himmatnagar on June 15th 1930 into the circumstances of the above mentioned accident.

2. The following officers attended the enquiry :—

Mr. J. S. Bearcroft ..	.. Ag. Executive Engineer, Sabarmati.
Mr. H. G. Frampton ..	.. Ag. District Traffic Superintendent, Ahmedabad Branches.
Mr. D. S. MacGee ..	.. Ag. District Locomotive Superintendent, Abu Road.
Mr. J. C. WILSON ..	.. Superintendent, Government Railway Police, B. B. and C. I. Ry.

Description of the accident.

3. On the 10th June 1930. at 18-10 hours, No. 60 Down Mixed train while running north-bound at mile 51|3-5 between Sonason and Himmatnagar stations at a speed estimated as 12 to 15 miles per hour, was struck by a severe storm. All the passenger vehicles were overturned, and 24 passengers in all were injured : of these one died on arrival at the hospital at Himmatnagar and two were detained there for treatment but are not seriously injured, while the remaining cases were of slight injury only.

4. The first 13 vehicles of the train, three of them open bogie trucks, and the remainder covered 4-wheeled wagons, were not affected ; the 14th vehicle was derailed and partly overturned ; and the remaining nine vehicles, which were all bogies, one being a covered goods wagon and the others, passenger coaches, were blown bodily over on to their sides. The couplings parted between the 12th and 13th vehicles from the engine and again ahead of the last three bogies, which were thus left 95 feet in rear of the preceding overturned coaches. The bogie trucks of two vehicles were torn off, but the coaches themselves were not heavily damaged, the estimated total damages to rolling stock being Rs. 1,800. The permanent-way was practically undamaged.

5. News of the accident was taken by the train engine to Himmatnagar station, where the Station Master acted promptly in asking aid from the Idar State medical and other authorities (which was quickly and freely given), and in sending and taking out assistance by car and train to the spot. The injured were all removed to the Idar State hospital at Himmatnagar for treatment.

6. Relief trains arrived from Sabarmati and Mehsana at 2-50 and 5-30 hours of the 11th, and through communication was restored at 10-50 by slewing the track slightly to clear the overturned vehicles.

Description of Site.

7. Sonason station is at mile 45¾ ; Himmatnagar at mile 54½. A falling grade of 1 in 500, 5,000 feet in length, changes to level at mile 51|3. A one degree curve to the left begins at mile 50|15 and continues to mile 51|7. There is a bank from 4 to 6 feet high at mile 51|3-5, the scene of the accident. The vehicles were blown off to the west of the line, *i.e.*, on the inside of the curve : most of them slid a short way on their truss rods before completely capsizing and working down the bank. The last three vehicles seem, from marks on the ground, to have moved forward only about 18 feet after the truss rods first struck the ground.

8. The composition of the train was as follows:—
Engine No. 108, YF Class.
No. 14206 open bogie wagon, empty.
No. 11176 open bogie wagon, empty.
No. 6750 cattle wagon, empty.
No. 6876 cattle wagon, empty.
No. 6461 covered goods wagon, loaded.
No. 13141 covered goods wagon, loaded.
No. 7321 covered goods wagon, loaded.
No. 12163 covered goods wagon, loaded.
No. 6431 covered goods wagon, Section road-van.
No. 6429 covered goods wagon, Section road-van.
No. 11060 open bogie wagon, Section road-van.
No. 6370 covered goods wagon, Section road-van.
No. 13201 covered goods wagon, Section road-van.
No. 6603 covered goods wagon, Section road-van.
No. 8465 covered bogie wagon, loaded.
No. 1121 bogie Third, Luggage and Brake.
No. 1547 bogie Third.
No. 2290 bogie Third and Brake.
No. 1549 bogie Third.
No. 529 bogie First, Second and Third.
No. 1550 bogie Third.
No. 1545 bogie Third.
No. 1810 bogie Third, Luggage and Brake.

The first two vehicles only had vacuum brakes in use.

The evidence shows that most of the windward side shutters must have been closed.

9. Mr. Bearcroft, the Executive Engineer, examined the track early on the 11th June before any alteration was made to it and found it in good order. I subsequently checked the radius and the superelevation of that part of the curve which had not been slewed for the accident. The radius varied between 5,000 and 7,000 feet, as compared with the nominal 5,730 feet. The superelevation also showed small variations between 1¼ and 1¾ inches ; the figure marked on the post at the commencement of the curve is 1½ inches.

10. From the damage done to trees the storm appears to have moved on a very narrow front. Two trees immediately adjoining the site were heavily damaged by a very severe gust, as several vertical branches 8 inches to a foot in diameter were broken clear through at about 10 feet from the ground.

Conclusions.

11. I find that the accident was due solely to the violence of the wind, which blew the train bodily over. A calculation as in the note attached, shows that a wind pressure of some 22 to 24 lbs. per square foot, according to the weight and size of the passenger vehicles concerned, would be sufficient to overturn them.

Remarks.

12. The superelevation given to the track was excessive for the curvature and the speeds in force, being about 1½ inches instead of a correct amount of about 1|8 inch for a speed of 15 miles per hour. This excess superelevation is equivalent to an additional wind-pressure of 0.7 to 0.8 lb. per square foot only, and I do not consider it had any material effect in causing the overturning of the train. Such an excess is however a possible cause of danger of derailment of another type, and now that the matter has come to notice, steps should be taken to see that a correct and suitable amount is shown on the superelevation posts and worked to on the track.

13. The evidence shows that some difficulty occurred in removing two of the worst cases of injury, *viz.*, those in the ice-vendor's compartment at the forward end of bogie No. 529. No tools were carried on the train ; a heavy pinch bar and a hammer were taken from the engine, and later, axes were got from a neighbouring village. The end panels of the coach through which the men were eventually rescued were however, only of millboard, and I cannot understand how the pinch bar proved ineffective in breaking a way in. Broken glass from the mineral water bottles was a great hindrance to the work here.

14. The cases concerned were actually *en route* by car to the hospital at 19-25, only one and a quarter hours after the accident occurred, and no unnecessary delay therefore took place.

15. The following appendix accompanies this report :—

(*a*) Note re : Wind Pressure.

APPENDIX (A).

Note re wind pressures which would overturn vehicles when empty.

1. *Bogie 3rd and Brake No. 1121.*

Side area subject to wind pressure 57 ft. × (11-2) ft. = 513 square feet.

This is effective at 2 + 4½ feet = 6½ feet above rail level.

Load empty 21.63 tons.

This may be taken as acting at 1 ft. 7½ in. =1.625 feet, from the lee-side rail.

Overturning pressure will be $\frac{21 \cdot 63 \times 1 \cdot 625 \text{ ton.}}{6 \cdot 5}$

= 5. 40 tons wind pressure.

The area being 513 sq. ft. this is equivalent to 23.6 lbs. per sq. ft.

2. *Bogie 3rd Class Nos. 1545, 1547, 1549 and 1550.*

Side area subject to wind pressure 49 ft. × (11-2) ft. = 441 sq. ft. effective at 6½ feet above rail level. Load empty 17.19 tons.

Overturning pressure will be $\frac{17 \cdot 19 \times 1 \cdot 625 \text{ ton}}{6 \cdot 5}$

=4.29 tons.

The area being 441 sq. ft. this is equivalent to 21.8 lbs. per sq. ft.

3. *Bogie 3rd luggage and brake No. 1810.*

Dimensions and area as above, 441 sq. ft.

Load empty 18.62 tons.

Overturning pressure 4.65 tons.

Equivalent to 23.6 lbs. per sq. ft.

4. Superelevation, 1½ inches instead of 1|8 inches correct for the estimated speed, is 1.38 inches in excess. Width between centres of rails is 41.9 inches and the additional superelevation is therefore equivalent to a reduction of about one-thirtieth of the limiting overturning pressure, *i.e.*, for the above loadings, about .7 to .8 of a lb. per sq. foot.

5. From the formula P lbs. per sq. foot = .003 V^2 for V miles per hour, a pressure of 21 lbs. per sq. foot would be due to a velocity of about 85 miles per hour.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

DERAILMENT OF 28 UP PASSENGER AT MILE 31|5 BETWEEN CAMBAY AND SAYAMA STATIONS ON 3RD JULY 1930.

FROM MR. G. W. N. ROSE, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1309 OF 1930, DATED THE 10TH JULY 1930.

In accordance with para. 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I forward herewith the report of my inquiry into the above accident held at Tarapur station on the 5th July.

2. The following officers were present at the inquiry :—

Mr. T. Cooper, District Loco. Superintendent, Ahmedabad.

Mr. A. N. Fairbourn, Executive Engineer, Baroda.

Mr. W. R. S. Morley, District Traffic Superintendent, Ahmedabad,

as well as the Inspector of Government Railway Police, Ahmedabad.

Description of the Accident.

3. On the 3rd July, at about 6-0 hours, No. 28 Up passenger met with an accident at mile 31|5, shortly after it had left Cambay, the terminus of the branch. The engine and tender No. 302, D. 1 class, (0-6-0), were completely derailed ; the 4-wheeled water-tank No. 733 and 4-wheeled luggage van No. 615 (both empty) immediately following it, were completely wrecked, and telescoped, the first into the second ; and their combined wreckage into the following bogie third No. 1291, for about one third of its length. This coach was occupied by a number of permanent-way gangmen of Cambay, proceeding to work at another station of the branch, and by some mendicants travelling without ticket. One mendicant and one gangman were killed ; one gangman died while being removed to hospital and *six* others received serious injuries. The driver and both firemen received slight cuts.

Description of Site and Circumstances of the Accident.

4. The accident occurred at mile 31|5 on a straight length of line some 600 yards outside the down outer signal of Cambay station, at the end of 1,800 feet of a falling grade of 1 in 200.

A 10-foot girder bridge, No. 61, lies about 150 feet beyond the point where the engine came to rest. Formation is about 8 feet above ground level.

5. Very heavy rain fell on the 2nd of July and the following night, causing considerable floods, followed later by several other breaches along the branch. The water rose at mile 31|5 up to the level of the top of the bank, but all the witnesses state that it had not topped it at the time of the accident, when there was fair visibility by day-light, even on a dark morning.

6. The flood later rose up to the rails and the flow across the lines scoured out the whole formation to a depth of 8 feet, for about 35 feet on each side of bridge No. 61, and for less depths over various other adjoining sections, including that occupied by the wrecked vehicles ; over most of these the up-stream (right hand) side of the bank was left unbroken, the scour working across from the left hand edge. On the 5th July, the two rails at the rear end of the breach, under bogie third No. 1291, were bent down into the gap under the wrecked vehicles, the engine was standing more or less on a level base with its wheels some 2 feet to the left of the correct line, and had sunk axle-deep in the water, which was then just below formation level. There was no noticeable flow across the line. One of the left hand rails beneath the engine had lost its fish-plates and had been caught by its free end and bent across, with the free end to the right.

7. The luggage-van body was completely smashed ; its underframe, carrying the water tank above it, struck the end of the following bogie third just above the seat level. Gangman Mula Vala was buried in the wreckage and his body was not able to be extracted until the following day. The unknown mendicant who was killed, was thrown clear and his body was seen floating in the water.

Conclusions.

8. The witnesses were unshaken that no flow of water across the track was taking place at the time of the accident, and that the track was intact, and I can therefore only conclude (somewhat improbably as it appears as compared with the alternative theory that the ballast or bank had already been scoured out below the left hand rail) that the bank was heavily waterlogged and perhaps scoured internally through fissures, rendering the track unable to support the weight of the engine. A joint of the left hand rail gave way under the settlement, the rail caught up and was bent as mentioned above, derailed the engine, and brought the train up causing the complete destruction of the two light four-wheeled vehicles immediately following the engine.

9. Dhana Madho, mate of the local permanent way gang, with three of his men had inspected the length concerned in the early hours of the morning a few hours before the accident, and prior to travelling in the train himself; he had found nothing requiring caution, and made no report to the station master, and no warning order was therefore issued to the driver, who, although he estimated his speed at the time as 10-12 miles per hour, must have been travelling, judging from the damage done, at least at the booked speed of 25 miles per hour.

10. No one can therefore be held to blame for the accident, which was a consequence of the abnormal rainfall. It is impossible to say whether the visible conditions at the site when Dhana Madho and his men inspected it between 4-0 and 5-0 hours were such as to require any special action by them. They must be given the benefit of any doubt as to this, especially as they knew they were travelling by the train themselves.

Remarks.

11. The evidence at the inquiry showed that the arrangements for night line patrols, which had been started on July 1st, were not being worked with any real liaison between the patrol men and the station staff. The patrol man appointed for the section ending at Cambay was sick and did not carry out his patrol. By arrangement, his neighbour from Sayama, the next station, patrolled the length up to the Cambay outer signal, but returned from there without reporting at Cambay, where the station master thus received no report on either of the two dates.

12. Actually mate Dhana Madho carried out a special patrol on the night of the 2nd, and as he considered the line safe, the fact of his not reporting at Cambay, did not affect the course of events. But in view of the fact that a special patrol staff is put on duty, the orders regulating their work should provide for positive reports from them at prescribed times to the stations concerned, in the absence of which, trains should only be permitted to run, under some restriction, if at all.

GREAT INDIAN PENINSULA RAILWAY.

DERAILMENT OF 16 UP PASSENGER AT MILE 404|8-9 BETWEEN NARAYANPETH AND YADGIRI STATIONS, ON 24TH JULY 1930.

FROM MR. R. H. IRANI, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 6, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 806 OF 1930, DATED THE 5TH AUGUST 1930.

In accordance with rule 7 of the Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith my report of an enquiry held by me into the circumstances attending the derailment of 16 Up Passenger at mile 404|8-9 on the South East Main Line of the Great Indian Peninsula Railway on 24th July 1930.

2. The enquiry was held at Yadgiri, a station near the site of the accident.

Description of the Accident.

3. The 16 Up Passenger consisting of a rake of 7 bogies left Narayanpeth Road at 14-46 hours (right time) on 24th July 1930 and was derailed at mile 404|8-9 at 15-10 hours.

The tender of engine No. 2219 (X A type) and all the six bogies were completely derailed and the seventh or the rearmost coach had its front bogie derailed ; only the engine kept the road. After the derailment the engine and the derailed tender broke off from the rake and came to a stop at a distance of 140 feet from the latter.

Two railway servants and three passengers were very slightly injured and continued their journey after receiving medical attention from the railway doctor.

The left wheels of most of the bogies were almost completely buried in the berm of the formation, and two of the bogies leaned over at an angle of about 25° to the vertical. The damage done to the Rolling Stock is however not serious and the Locomotive and the tender were not damaged at all.

The rake travelled a distance of about 400 feet from the point of derailment before coming to a stop.

The track was completely destroyed for a length of about 400 feet.

Description of the Locality of the Accident.

4. The accident took place at mile 404|8-9 between Narayanpeth and Yadgiri stations on the single line section of the South East Line.

The permanent-way consists of 82 lbs. B. H. 30 feet rails on R. and L pots with 12 pot sleepers to the rail length. The rails are 32 years old and little worn owing to their being subjected to comparatively light traffic during the period.

The track is bedded on stable sandy soil and is fully ballasted. Old coil keys exist in the track from the Bombay end up to the end of the 2nd bogie from the engine. From the 2nd bogie towards Raichur, new wooden keys were fitted throughout about 2½ months ago. Fish-plates are five-holed.

5. The accident took place on a left hand curve of 7,920 feet radius the superelevation of which was nearly correct. Commencing from Narayanpeth Road there is a falling grade of 1 in 300 for a length of about a mile followed by a rising grade of 1 in 304 about ¼ mile in length extending upto the place of accident, after which it is on the level. At the site of accident, the formation is in a shallow cutting.

6. The weather was fine and the condition of soil was quite good. There was no rain for the previous 4 days.

7. The train was worked with the automatic vacuum brake in good condition, and was running approximately to booked timing.

8. The weights of the engine and tender in working order are 66½ tons and 42¼ tons respectively, the axle loads on the driving wheels being 13 tons. The gross load of the train was 278 tons.

9. The track which was undisturbed behind the site of the accident was tested by me and was found well maintained in every respect except the gauge which was found to be 1|8″ to 3|8″ tight.

Conclusions.

10. From the evidence of the driver of 10 Up Madras—Bombay Mail which passed over this site about an hour before 16 Up Passenger derailed, it is seen that he received a jerk at this place which made him issue a message before the 16 Up came to the site of accident asking the Permanent-Way Inspector to attend to the road. He also states having seen three men standing near the boundary fence at this place, who were considered to be some strangers.

11. Both the P. W. Inspector, S. W. Inspector and the Mucadum, who were the early arrivers on the scene of the accident, state that five successive keys behind the joint where the first wheel derailed were found missing or removed.

12. Most of the witnesses also say that the fishplates of the joint where first the wheel derailed were splaying towards Raichur end and three of its five fish bolts were broken. This I am of opinion, could only have happened after the derailment as a result of damage done by the derailed coaches passing over it.

13. The gangmen had attended to the work of packing and aligning this bit of track on 19th July and I do not think there could have been any serious defect that may have developed in it in such a short time, *i.e.*, 5 days after it was attended to and inspected by the Permanent-Way Inspector, especially as there was no rain during this period.

14. The train was running approximately to time and to keep up booked timing she had to run between 42 to 45 miles per hour in places as against the maximum permissible speed of 40 miles per hour over this section.

Although the accident took place at the top of the short 1 in 304 rising grade following a long 1 in 300 falling grade, from the positions of the vehicles and the engine after the accident, it is considered that the train must have been running at about 45 miles per hour. I, however, consider this speed not dangerous over the 82 lbs. track which can safely carry this train at that speed. If any accident were to take place due either to excessive speed or to any original defect in the track on this left handed curve one would expect that either the right hand wheels should have mounted and dropped outside the outer rail or the left hand wheels should have dropped inside the inner rail. I am therefore of opinion that the derailment was not due to original defect in the track or excessive speed.

15. During my inspection of the place of derailment several pieces of some cast iron material about 3|8″ thick were picked up at the point where the first wheel derailed, *i.e.*, between the 6th and 7th vehicles. This cast iron piece is discovered to be a portion of the cast iron tubular telegraph post which is in use for carrying the telegraph wire along this section. It is supposed to have been placed on the rail by some unknown person before 10 Up Mail arrived, as evidenced by the message issued by the driver of 10 Up Mail (*vide* para. 10).

16. There are strong evidences of the five successive keys behind the point of derailment having been removed, as noticed by me personally, and an obstruction of a cast iron piece having been placed on the rail before the arrival of 10 Up, the passing of which must have rendered the road more or less unsafe for the next train. The passage of the engine and tender of the 16 Up which followed appears to have aggravated the defect in the track and it was one of the first three coaches that came off the rail dropping outside the inner rail due to certain extraordinary conditions that appear to have set up under the passing load.

17. My finding in this case is that the derailment of 16 Up was caused by defects in the track that developed in it due to some unknown persons having maliciously removed wooden keys and placing an obstruction on the rail with the intention to wreck 10 Up Mail which preceded 16 Up.

Recommendations.

18. (*a*) There exist standing orders to the effect that the drivers are to report to the Permanent-Way Inspector mileages where running is bad. I suggest that they be asked to issue wire messages to " all concerned " when unusually heavy jerks are experienced so that all the subsequent trains may pass cautiously over the dangerous portion till the Permanent-Waw Inspector has advised that the defect in the road is removed.

(*b*) The drivers in their statement say that they have to run 45 to 50 miles per hour in order to keep up time although the maximum permissible speed between stations on Wadi—Raichur section is 40 miles per hour. It appears that the time-table requires to be recast so that at no place on this section 40 miles speed is exceeded till the speed limit is raised by the Engineers.

19. The following is the estimated cost of damage :—

	Rs.
Permanent-Way	1,584
Rolling stock	1,925
Locomotive	25
Total ..	3,534

BENGAL NAGPUR RAILWAY.

DERAILMENT OF 13 DOWN PASSENGER AT MILE 480|22-23 ON THE HOWRAH NAGPUR SECTION ON 31ST JULY 1930.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 2083|XIII|30, DATED THE 31ST OCTOBER 1930.

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I submit my report on the derailment of 13 Down Passenger on 31st July 1930 at Mile 480|22-23 on the Howrah Nagpur Section of the Bengal Nagpur Railway.

2. A senior officers' enquiry was held on 4th August 1930 and the evidence recorded thereat was accepted by me ; I held an enquiry at Bilaspur on 11th August 1930 ; the site of the accident was visited the same day.

Description of the Accident.

3. On 31st July 1930, at about 5-10 hours, while 13 Down Passenger was proceeding from Raipur to Bilaspur, it was derailed at Mile 480|22, between Hatbandh and Bhatapara on the Bengal Nagpur Railway.

The train was marshalled in the following order :—

Engine No. 795 M.	Tons	171
(*i*) Bogie No. 1483. (*ii*) Bogie No. 1515. (*iii*) Bogie No. 1457 (*iv*) Bogie No. 1400. (*v*) Bogie No. 855. (*vi*) Bogie No. 1015. (*vii*) Bogie No. 1292. (*viii*) 4 Wheeler No. 771.	Tons	287
	Total ..	458

4. The forepart of the engine remained on the rails—the tender and Nos. (*i*)—(*iv*), (*vii*) and (*viii*) dropped between the rails and were laterally displaced upto 2½ ft. ; Nos. (*v*) and (*vi*) came to rest from 3 to 6 ft. off the centre line.

All the derailed vehicles remained upright except Nos. (*v*) and (*vi*) which tilted over at an angle of about 20 degrees.

The drawbar hook of No. (*ii*) broke and it was left standing on a 1-20 ft. Girder bridge ; the engine and No. (*i*) travelled on for 780 ft. before coming to rest.

5. The track from Mile 480|16-22 was badly smashed up, the sleepers were shattered, several rails bent and the ballast ploughed up ; on the girder bridge the rails were pushed inwards and really functioned as inner guard rails, thereby preventing any of the wheels going off the end of the sleepers and into the nullah below, a drop of some ten feet.

The damages amounted to Rs. 13,500.

6. Two women passengers complained of bruises on the shoulders but declined medical aid, no one else was injured.

Thirteen passenger trains were transhipped until through running was restored at 14 hours on 2nd August 1930.

The weather was cloudy and threatening and it was dawning when the accident occurred.

Description of the Locality of the Accident.

7. The track is straight for some distance on either side of the site of the accident, graded down at 1 in 240 from Mile 481|11-12 to Mile 481|1-2 whence it runs level to Mile 480|19-20 and then rises at 1 in 150 to Mile 480|6-7. At Mile 480|19-18 is a 20 ft. open deck girder bridge with a drop of some 10 ft. into the stream below. It has no guard rails—the general practice on the railway—and the girders were temporarily resting on wooden bed blocks.

At Mile 480|12-24, the banks are from 8-8½ ft. high and composed of a blackish clay mixed with moorum ; this is found locally overlying a stratum of rock ; once it has consolidated it does not appear to give trouble in the sub-grade.

History and Condition of the Track.

8. The track consists of 90 lb. F. F. B. S. Rails on Sal sleepers at N + 3 per rail laid in 1912-14, each rail is secured to each sleeper by two screw spikes ; stone ballast at 16 c. ft. per ft. run is provided.

Maintenance is done by gangs consisting of 7 men, one Mate and one Key-man for every three miles ; the gangs are under a P. W. Inspector in charge of a 47 mile length, having five way-side stations in addition ; he has one assistant in charge of a specific length.

9. The Inspector and each gang have a small imprest of sleepers intended for use in emergencies only, they are not permitted to use them for casual renewals of broken or damaged ones.

The Inspector has a reserve stock of sleepers as well, which are available for casual renewals within strict limits and only with the permission of the District Engineer. The latter is given a specific quota for renewals by the Chief Engineer and doles them out among the inspectors.

10. A detailed examination of the track on either side of the derailment gave the following results :—

(*a*) Five to seven sleepers per rail length were not fit for a main line and required immediate renewal.

(*b*) The gauge varied from $\frac{1}{2}''$ tight to $\frac{3}{8}''$ slack.

(*c*) The elevation was upto $\frac{3}{8}''$ low in one or other rail.

(*d*) Most of the sleepers had been respiked, many of them twice over.

(*e*) The old spike holes clearly indicated in many cases that the screw spikes had been pushed outwards upto $\frac{5}{8}''$, the size of the head tended to hide this.

(*f*) The sleepers bore indentations and burrs where the track had spread up to $\frac{3}{8}''$ and had obviously sprung back ; this feature was noticeable principally on one rail at a time and, in the case of the ten rails immediately preceding the initial sign of derailment, reached the maximum of $\frac{5}{8}''$, first on the five right ones, then on the two left ones, then on a right one and finally on both right and left for the last two rails.

(*g*) Between Mile 477-480, I saw some fifty sleepers per mile actually broken under the rail seat and the ends cocked up.

11. Inspection of the gangs' muster rolls showed that from 1st January 1930 to 31st July 1930 the men had worked at Mile 480|22-23 on 31st January and 28th and 29th May only.

Inspection of records of issue of materials showed that as regards this site :

(*a*) From imprest, neither sleepers nor fastenings were issued from 1st January 1930 to 31st July 1930.

(*b*) From reserve, nothing was issued from 1st January 1930 to 31st July 1930.

12. The track diagrams in the District Engineer's office show the type of rail and class of sleepers but do not indicate the date of laying ; neither graphs nor records are maintained showing percentage of unserviceable sleepers per mile ; a statement is however compiled annually showing total number requiring replacement ; if funds permit they are replaced ; if not, they are left in the track.

No regular reports at prescribed intervals are submitted by the P. W. Inspector regarding the condition of the track ; when circumstances warrant it he submits a report on any features which require special attention.

13. In this case, after the introduction of the M Class engine, special reports were called for and duly submitted by the P. W. Inspector ; from a perusal of six of these reports since April 1930 it is evident the P. W. I. sized up the condition of the track and clearly indicated that between Hatbandh and Nipania Mile 466-485, where the Sal sleepers of 1912-14 were laid, it was becoming impossible to maintain the road with any degree of safety and that he required

new sleepers at the rate of 1,000 per mile and 2 to 3 additional men per gang with a Head Mistry for supervision ; he was only given some men for two months.

Examination of the P. W. I.'s Note Book showed that it is more or less of a record of receipts and issues of material, with occasional notes about the track. Nothing is shown regarding the work done by gangs as to the amount of through packing and general maintenance. The muster rolls of the gangs show the actual site of day to day work but do not indicate what is actually done.

14. There were rather unusual features in the fracture of fishplates. No less than ten pairs were broken at variable distances ; from Mile 480|22 and nearly upto Mile 480|20 both rails were forced outwards and six pairs of fishplates broken ; this clearly indicates that while the engine was on the track the tender must have derailed behind it and fallen inside the rails. The pair of rails immediately preceding the bridge were pushed forward bodily and bent and came to rest on it inside those on the bridge itself.

At Mile 480|20, the rails on the bridge were pushed inside and fell over inwards towards the centre of the track ; on the bridge sleepers there were clear indications of wheel marks where the rails should have been, showing how the derailed tender and the first coach had passed over.

15. The bunching of these two pairs of rails inside their normal position is a very puzzling feature and difficult to account for as those immediately ahead of the bridge and for some distance beyond were pushed outwards. The only theory I can put forward is that the trailing tender wheels must have been outside the rails on one side and inside the other and the wheels of the leading bogie of the coach immediately behind were exactly opposite, and between them pinched both rails inwards ; the trailing bogie wheels of the coach must have struck the ends of the pair of rails preceding the bridge and pushed them along. The fracture of one of the rails appears to have been caused by the pinching action of the wheels.

The fractured fishplates were heavily marked and distorted ; the wooden sleepers were badly broken and had many marks on them and the marks on rails and wheels were so numerous that nothing could be deduced from the condition of any of them.

All damaged track material was properly accounted for and either found attached to or contiguous to the rails and I think there is no doubt that there was no tampering with the track, moreover 190 Up only passed 20 minutes before the accident.

History and Condition of Rolling Stock.

16. *Locomotive.*—The M Class " De Glehn " is a 4-6-2 compound engine with a 4-4 tender, having a designed maximum axle load of 21.5 tons on the driving axles and weighing in working order 171 tons. The coupled wheel base is 13′ 2″ and the total wheel base 36′ 1″. The bogie and radial trucks of the engine have side play of three inches on each side.

The engine proper has a compensating arrangement between springs ; the camber of the latter varied as follows :—

Bogie truck	*Nil.*
Driving Wheels	3|6″
Radial truck	*Nil.*
Tender	5|16″

17. The wheels and tyres were in good order and the former were tight on the axles. The engine frames were in good order, the cross stretcher plate between the L. P. and H. P. driving boxes was found cracked for ¾ of its depth from the top, this is attributed to a previous derailment. The engine bogie slides were in order, except that there were signs of binding on the cross frame at the back.

The bogie brasses showed signs of greater weight being thrown on the outside of the boxes. The bogie horn cheeks showed signs of boxes binding in various places at the top, back and front.

18. Clearances between bottom of axle boxes and horn stays showed variations as follows :—

Bogie	3|8″
Drivers	1|2″
Radial truck	3|8″
Tender	1⅛

Clearances between the frame and bogie beams on the tender varied by 13|16″.

The buckle of the left trailing tender spring was fractured and had a clean, crystalline appearance ; the spring was stripped and the top leaf was cracked across at the end of the slot ; the springs are nibbed.

These measurements were recorded with the engine standing on an ashpit and more or less level.

19. During the time this engine has been in service, it has had 11 hot boxes in 7 months ; I examined the records of 14 M Class engines and found a maximum of 34 hot boxes on one engine in 7 months, the average working out to 4 hot boxes per engine per month. There seems to have been undue trouble with keeps of axle boxes and owing to there being no spare ones in stock one engine had to be laid up to obtain spares of any kind as none were received.

20. The actual and designed weights on the wheels of the engine were as follows :—

Engine	Actual		Designed.	
	Right	Left		
Bogie truck leading.	5·85	5·6	5·875	Tons
Bogie truck trailing.	5·85	5·85	5·875	
Driver, Low Pressure.	11·0	11·75	10·75	
Driver, High Pressure.	11·15	11·1	10·7	
Driver, Trailing.	11·55	10·25	10·725	
Radial truck.	8·55	8·35	8·575	
Tender.				
Front Bogie leading.	8·0	8·0	8·3	
Front Bogie trailing.	8·25	8·0	8·3	
Rear Bogie leading.	8·1	8·0	8·1	
Rear Bogie trailing.	8·1	8·05	8·1	
Total weight	171·35		170·6	

From the above it would appear that this engine though designed with a maximum axle load of 21.5 tons has actually an average of 22.25 tons with a maximum of 22.75 tons on drivers : this is a serious matter as regards the track and I consider others of the same class should be weighed to ascertain the true state of affairs.

The discrepancies in the weights on the several wheels probably exceed what one would expect to find in normal running especially in the case of the trailing driver where the difference is unduly high, *viz.*, 1.3 tons or 12½ per cent.

21. *Coaching Stock* —The damages to stock were, as one would expect, very varied and general, all fractured parts were clean probably as a result of the

derailment ; the only exception was the drawbar hook of Bogie No. 1515 which had a flaw in it.

The dates of overhauling indicated the vehicles had been in service for from 6-10 months ; the stock was not older than 16 years. The right leading tyre of the trailing Bogie of coach No. 1483 had snapped across and the metal was clean ; there were some unusual patches of red rust on the side of the run of the wheel where it meets the tyre and gave one the impression that moisture had got in between the two ; I was unable to find similar signs on any other wheels on the train. The camber of springs on this coach varied by $\frac{3}{4}$".

The Train Examiner's registers were inspected and it was found petty repairs only had been done on this rake during the past four months.

Conclusions.

22. There are three features in respect of the evidence in this case which stand out prominently, *viz.* :—

(*a*) The condition of the track.

(*b*) The speed of the train.

(*c*) The condition and behaviour of the engine.

23. In regard to the track the facts cited above clearly indicate that it was not in a fit state for trains running at high speed. The Sal sleepers were from 16-18 years old, the normal life is fourteen years and as 40 per cent. were unserviceable steps should have been taken to either renew them entirely or in part.

24. The P. W. I. made very sweeping reports on track conditions from April onwards and though he exaggerated the facts somewhat I do not consider that his warnings were given the attention they deserved. The District Engineer made an engine inspection in May and considered the road was very good and reported as such. On receipt of further reports from the P. W. I. the District Engineer directed the Assistant Engineer to make personal inspections and submit proposals ; the Assistant Engineer did this in June and July and submitted a report on 15th July 1930. The District Engineer intended making a further examination but before he could do so this accident occurred.

At the end of July the District Engineer represented in person at Head Quarters that he required more sleepers for casual renewals and was allotted 2,500 more making his quota 10,000 in all for 38$\frac{3}{4}$ miles of main line ; lack of funds precluded more being given.

25. In view of the constant use of M Class engines with heavy axle loading, existing track conditions were certainly unsuited to speeds which could in practice be attained on undulating sections with grades of 1 in 150 to 1 in 240 ; in such circumstances those in charge of the track accept heavy responsibility if, as the result of misjudgment of the risks involved, steps are not taken either to impose speed restrictions or to adhere to the requisite standards of maintenance and construction.

That there was grave misjudgment in respect of the conditions of these old sleepers is, I think, clear.

26. In this respect the usage and methods of working have naturally an important bearing ; in these days of high speeds and heavy axle loads one should be able to see at a glance from the history of track where there are latent sources of danger which may be overlooked by the men on the spot.

27. In regard to the speed of the train, Guard Sherard's timings show Hatbandh was left at 5 hours and the derailment occurred at 5-10 hours ; the distance covered was 4.5 miles and the speed therefore works out to 27 miles per hour.

Guard Sherard states it was 35 miles per hour ; Driver Bevan says 30 miles per hour and Firemen Waters says 25 to 30 miles per hour.

The derailment occurred at Mile 480|22 and the engine stopped at Mile 480|16, *i.e.*, some 1,320 ft. away. During this interval seven bogie coaches, a 4-wheeler and the tender were ploughing their way through the sleepers and ballast ; a drawbar hook was broken near Mile 480|20 ; the train pipe parted at the same spot and automatically applied the vacuum brake on the engine and one coach which ran for some 880 ft. ; the driver was running nearly an hour late,

he had just come down a 1 in 240 grade and the sides of the derailed wheels were grinding against the rails.

Normally such a train, running at 30 miles per hour, should be pulled up on an emergency stop in 500 ft. Yet with the retardation of the vacuum brake fully on and the derailed wheels, it is difficult to believe the speed was that cited above. I have no hestitation in rejecting all the evidence on this point and am of opinion the speed could not have been less than 50 miles per hour.

28. No blame can attach to Driver Bevan for running at this speed as the maximum is 60 miles per hour and it is a very regrettable feature of these accidents that such mis-statements are made. Driver Bevan admits his vacuum brake was in good order and unless one rejects his evidence the only conclusion one can come to is that the " M " Class Engine has inefficient brakes.

The question of speed is only material in connection with the behaviour of " M " Class Engines on track that is not in first rate condition ; other drivers have testified to the undue hunting or nosing action that is set up on bad spots in the track and I can appreciate this as I made a test from the footplate of one and was rather struck with this feature.

29. The " M " Class Engines were received late in 1929 and put into service early in 1930 ; in April sanction was asked for to run these engines, when incorrect diagrams of them were submitted ; more information was asked for by me and eventually correct diagrams were furnished ; in June, I called for statements regarding strength of track and bridges and received a reply only recently.

It is evident therefore that these engines were put into service before sanction to do so was even asked for and that this irregularity coupled with the fact that they were allowed to continue running, is in contravention of the Indian Railways Act.

Pending the sanction of the Railway Board I have imposed a speed restriction of 35 miles per hour on the running of " M " Class engines on 85 lb. B. H. track with N + 3 Sleepers. This was done on the understanding that the maximum axle load was 21.5 tons ; it appears, however, from para. 20 above, that this figure is as high as 22.75 tons and the speed may have to be reduced to 30 miles per hour as for XE engines.

30. Engine No. 795 M was previously derailed on 10th July 1930 and after an ordinary examination was put into service again ; the damage to the stretcher plate was not detected and the weights on the wheels were not checked as facilities for doing this did not exist for such heavy engines at Bilaspur.

It certainly looks as if an engine should be sent to shops for expert examination whenever it is derailed at speed, as defects cannot otherwise be readily detected and undue risks are taken. As the engine was not derailed, the weights on wheels must have prevailed for some time and must have accentuated the oscillation of the engine.

31. My conclusion therefore is that the derailment of this train came about as the result of the existence of unserviceable sleepers, which being unfit for the road, afforded insufficient lateral support to the fastenings.

Notwithstanding the evidence there is little doubt that high speed and the condition of the engine were contributory factors. The case is an illustration of the punishing effect which a heavy engine is likely to exercise on the track, thus rendering itself more liable to derailment should weakness exist and the margin of safety be unduly lowered.

In this case the track was sufficiently weak laterally to permit of spreading as the result of movement of the nosing type and that derailment did not occur earlier is probably due to the oscillations not synchronising with the weakest portions in the track. As rail spread increased the oscillations naturally became more violent until the track failed and derailment occurred.

Recommendations.

32. I would suggest that action be taken on the following points :—

(*a*) Track diagrams should have complete information regarding age of material.

(*b*) Sleeper graphs should be maintained showing the percentage of unserviceable ones annually.

(*c*) A system of reports should be introduced, at least, every quarter, showing the condition of track, &c., and the action taken on defects brought to light.

(*d*) The muster rolls should show from day to day the nature of the work done by gangs.

(*e*) Instructions regarding maintenance should be drawn up for the guidance of track staff in the form of a manual.

(*f*) Explicit orders should be laid down regarding the imposition of restrictions.

(*g*) When serious defects are brought to light, immediate steps must be taken to safeguard trains.

OF THE
BOMBAY
BRANCH
OF THE

EASTERN BENGAL RAILWAY.

DERAILMENT OF 7 UP DACCA MAIL, NEAR MILE 73, BETWEEN BANPUR AND DARSANA STATIONS, ON THE 7TH SEPTEMBER 1930.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 887, DATED THE 16TH SEPTEMBER 1930.

I beg to submit herewith my report on the above accident enquired into by me under Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930.

2. In addition to Railway Officers, the following officers were present at the enquiry, which was held at Darsana, on the 9th September 1930 :—

(1) Mr. T. C. Roy, District Magistrate, Nadia.

(2) Mr. T. Mirza, Superintendent, Government Railway Police.

(3) Mr. C. G. Grassby, Superintendent of Police, Nadia.

3. A large proportion of the questions asked came from the three officers named above ; Mr. Roy, the District Magistrate, was also very helpful in speaking to and eliciting replies from witnesses in Bengali.

Description of the Accident.

4. On the night of the 6th-7th September 1930, in clear weather and in bright moonlight, No. 7 Up Dacca Mail was travelling on the Up line of the Double Line between Banpur and Darsana, at normal speed and up to booked time, when it was derailed of nearly all its wheels. The driver had felt the wheels under his cab derail near Mile 72¾ and had immediately applied his vaccum brake and the train came to a stand within its own length. The only wheels of the train remaining on the rails were the leading four pairs of the Engine (4-4-2 type) and those of the trailing bogie of the last coach. All the other wheels, comprising 1 pair of the Engine, 3 pairs of the tender and all the wheels of 9 bogie coaches and of the leading bogie of the last coach, were off the rails, on the left side of the track. The third coach from the Engine, *viz.*, Bogie Coach No. 641, had fallen over the left side of an undecked girder bridge of a total clear span of 77 feet (sustaining a drop of 10½ feet) and had overturned, the body becoming detached from the under frame and turning right over. Four persons were killed and fifty-six injured, fifteen of them sufficiently seriously to be detained in hospital.

5. The following was the composition of the train :—

Engine No. 534 M. S., 117 tons.

(1) Bogie Third and Luggage Van No. 1897, 35 tons.

(2) Bogie Inter Postal No. 268, 28 tons.

(3) Bogie Third No. 641, 34 tons.

(4) Bogie Inter and Third No. 1563, 35 tons.

(5) Bogie Composite No. 1308, 40 tons.

(6) Bogie Composite No. 1320, 39 tons.

(7) Bogie Third No. 1023, 34 tons.

(8) Bogie Third No. 1713, 36 tons.

(9) Bogie Inter and Third No. 1562, 30 tons.

(10) Bogie Third Luggage and Brake Van No. 549, 33 tons.

The approximate cost of damages was—

	Rs.
Permanent Way	3,000
Rolling Stock	55,266

Description of the Locality.

6. The scene of the accident is rather more than 1½ miles South of Darsana station (Mile 74½) on the double line between Calcutta and Ishurdi. The alignment is straight from Mile 71 to 79 and nearly level. Formation is generally in low bank. The first point of derailment was about 63 feet northward of T. P. 72|17. There is a girder bridge of 3 spans of 27 feet, at T. P. 72|19, crossing a depression in which there was 18″ of standing water, and a gate lodge at T. P. 72|22. The last telegraph post in this mile is 72|23. On the left of the formation, about 90 feet away from the left track, opposite the point of derailment, there is a standing jute-crop, 9 feet tall, and a definite footpath leading from it to the bank, between which and the fence there is ample cover by bushes for a crouching man or men. The bunds of the bridge at right angles to the formation are also covered with bushes. The track, consisting of 90 lbs. F. B. Rails on Oregon Pine sleepers, and bearing plates, was in good order behind and ahead of the derailment.

Detailed Statement of Evidence taken.

7. The chief evidence points to the right rail of the up track being practically intact, the left rail broken up into its elements of rails, fishplates, and fishbolts and the first rail unit on the left lying on its right side outside the track, with its fishplates and fishbolts and many of its screw spikes lying near by undamaged, and obviously removed by a tool.

8. The loose rail and its fastenings were found first by Mr. Nogendra Nath Biswas, Head Train Examiner, Ishurdi, who arrived about 6 A.M., just about when it was getting light enough to work and began re-railing the Brake Van Coach.

9. When the Brake Van was moved back at about 6-30 A.M., Mr. Bose saw this loose rail and little heap of fastenings and invited the attention of the Traffic Inspector, Ranaghat, and the Permanent Way Inspector, Ranaghat, to them. Not long after this Mr. Pont, the Signal Engineer of the Eastern Bengal Railway and Mr. Sahgal, the Executive Engineer, Kanchrapara, arrived and were shown these things. Mr. Pont prepared a sketch which is in my file and Mr. Sahgal has supplied a diagrammatic statement showing the condition at each joint. This evidence confirms the evidence of the Head Ticket Examiner, Ishurdi, and the Permanent Way Inspector, Ranaghat.

Conclusion.

10. The evidence is conclusive that a rail on the left side of the track, had been stripped of its fastenings, beginning at the third joint from T. P. 72|17. I find that the accident was due to such stripping by some person or persons unknown, between the passage of 15 Up North Bengal Express and the arrival of 7 Up Dacca Mail.

Remarks.

11. There are certain features of the accident that I consider I should remark upon :—

Firstly :—The unfortunate results of the derailment were accentuated by the presence a short distance ahead of the point of derailment, of a girder bridge long enough to allow a full sized bogie coach to drop between its abutments. Had this coach not capsized, the casualties would have been slight. As the coach must have overturned when the train had considerably slowed down and the outer wheels appear to have slipped just off the ends of the bridge sleepers, it could be argued that an efficient wheel guard on the bridge might have saved this coach. It is for consideration whether the Eastern Bengal Railway type of wheel guards is really efficient. The type in use appears to me to have been designed only to keep the sleeper spacing and with no intention of keeping a derailed vehicle on the bridge.

Secondly :—The derailment caused the left rail to break up into its elements, *i.e.*, for rails, fishplates and fishbolts to become separated by the failure of the fishbolts. While it is possible for a pair of derailed wheels to run at a uniform distance from the rails for a distance of 700 feet, shearing every fishbolt, it is very far from probable and what is far less probable is that 59 out of 60 bolts should be so broken and mixed up with the broken sleepers that pieces only

of 10 or 11 could be found. While this has no bearing on the cause but merely on the result of the derailment, it is worth the while of the Administration to investigate the practice with regard to the tightening of fishbolts throughout the line. The bolts that failed here were probably excessively tight, even to the point of breaking.

Thirdly :—The gang in whose length the derailment occurred used their gang tool box situated at mile 71|13 very sparingly. They lived in villages a mile off the line opposite mile 74½ and probably took their tools home or hid them. This matter of tools and tool boxes is already engaging the attention of the Administration. Tool boxes should be of masonry or reinforced concrete and the lids should be incapable of being prised up for the extraction of tools.

OF THE
BOMPAY
BRANCH
OF THE

BURMA RAILWAYS.

DERAILMENT OF 12 DOWN MIXED TRAIN AT MILE 227|19, BETWEEN YWADAW AND PYINMANA ON THE RANGOON-MANDALAY MAIN LINE ON 15TH SEPTEMBER 1930.

FROM MR. R. HATT-COOK, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, BURMA, RANGOON, TO THE SECRETARY, RAILWAY BOARD, SIMLA, No. 761|15-A., DATED THE 22ND SEPTEMBER 1930.

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith my report of the enquiry held by me into the circumstances attending the derailment of 12 Down Mixed train at mile 227|19, between Ywadaw and Pyinmana on the Rangoon-Mandalay Main Line, Burma Railways on 15th September 1930.

2. The enquiry was held by me on 19th September 1930, at Pyinmana and was attended by the Magistrate, Deputy Superintendent, Railway Police, and the District Officers of the Railway.

Description of the Accident.

3. I inspected the site of accident on 16th. The accident occurred at approximately 1 A.M. on the morning of September 15th. The train concerned was 12 Down Mixed, it arrived at Ywadaw 13 minutes late and on its run to Pyinmana at about 2 miles from Ywadaw, it ran into a breach at mile 227|19, which had been caused by very heavy local rain during the two previous hours. The Engine and tender, 10 Goods wagons, 1 Bogie Touring Saloon and 1 Bogie Brake were derailed, the remainder of the train consisting of 7 Bogie Coaches kept the rails.

The marshalling of the train was in the order given above. The Engine, a 6 coupled express passenger engine remained vertical, the tender partly capsized on the right of the track and the following 10 wagons capsized and bunched up on the right, the Bogie Touring Saloon and the Bogie Brake derailed on the right of the track, remaining in the dip caused by the breach. The engine and the tender passed over the breach (which could not have been a total one) dragging the 10 wagons across the breach ; 8 of these wagons contained live stock, many of which were killed. The Saloon was occupied by the Honourable Mr. U Ba Tin, Education Minister and Mrs. Ba Tin, both of whom were luckily uninjured, and four servants one of whom was killed and the other three injured. The Saloon end was badly knocked in and the Minister and his wife had a miraculous escape, the frame work had to be broken open to rescue them and also the servants. The Brakesman whose compartment was next to the Saloon dragged himself out of the wreckage by means of the fencing and landed in water waist deep. The Driver and Firemen escaped injury, chiefly because the engine remained vertical. No passengers in the other coaches were injured or complained of shock. The lights remained on in the non-derailed coaches. The engine came to rest about 160 feet beyond the breach. The vacuum brake and headlights were in good order.

The Accident Specials from Yamethin and Toungoo arrived at 5-40 hours and 6-7 hours respectively on the 15th morning. The wreckage was cleared at 12 hours on 16th and through running resumed at 20-20 hours.

Description of Locality of Accident.

4. The site of the accident was on the single line on a 2 degree left hand curve with the direction of 12 Down and 1 in 300 down grade and on a 4' bank composed of sand and shingle lying between two short cuttings. There is a considerable rise in the adjoining ground to the right of the track, the ground to the left sloping slightly down to the adjoining paddy fields. There is one 3 foot culvert in the portion of bank lying between the cuttings which was insufficient to take the flood water from the considerable catchment area on the right. There is no record of a breach ever having occurred at this spot in the past. Within a short distance of the site of the accident, there is a gang hut and it seems, although the evidence is somewhat conflicting, that the line had been patrolled before the passage of 12 Down towards Pyinmana although there were at the

time no weak spots on this side. The flood water rose to the level of the top of the bank and this must have occurred after the patrol passed otherwise he would have noticed it. The track on either side of the breach was in good order but at the breach, three 36′ rail lengths were torn up. Another breach occurred on the same morning at mile 228|7-8, this was being watched as it was known to be liable to damage. At the site of accident the bank was breached behind the north abutment of the 3′ culvert ; the complete breach must have taken place after the passage of 12 Down Mixed.

Conclusions.

5. After weighing the evidence and taking into account the circumstances, *i.e.*, the very heavy rain, the breach, the position of the engine and the stated speed of the train I have come to the conclusion that the accident was caused by an almost complete breach of the bank at mile 227|19, caused by the very heavy local rain which fell for two hours previous to the accident. The engine dipped and lurched badly over the site of the breach thus causing it to derail. The following wagons also must have dipped and lurched even more than the engine and I consider that the passage of the engine and 10 wagons over a very shaky bank must have completed the breach. The evidence shows that at mile 228|7-8, the driver slowed down seeing a lot of water against the bank ; he then opened up thinking that the danger was passed, he was evidently on the alert. When he came on to the curve (2 degrees) on which the accident occurred, the driver or the 1st Fireman could not see ahead more than about 200 feet owing to the fact that the beam of light from the electrical headlights throws tangentiae to the curve. This distance was tested on the evening of the day of Enquiry by the District Officers and myself and it was found that beyond 70 yards from the foot-plate, objects were not clearly visible. I consider that the evidence and the actual position of the engine beyond the breach show that the Driver was not going at an excessive speed and that he applied his brake at once when he experienced the severe dip and lurching of the engine thus preventing a disaster and both he and the 1st Fireman stuck to their posts. The permanent way on either side of the breach was found to be in good order and there were no derailment marks on the Ywadaw side of the breach. I find that there is no fault in the working of the Railway in this accident, and the Administration are in no way to be blamed for it.

Recommendations.

6. (1) That a Field Telephone should be part of the Equipment of every Accident Special and that each Telegraph Inspector should have at least one spare in stock.

(2) That all staff concerned should have it impressed on them that Accident Specials must have priority over all other trains. If any doubt arises about this, the matter should be referred to the District Traffic Superintendent who, in consultation with the District Locomotive Superintendent, should settle the point and, if the latter officer is not available, then the District Traffic Superintendent should issue orders to the Station Master concerned.

(3) The electrical headlights should have a swivelling motion under the control of the driver to enable him to see further ahead around curves.

(4) In case of emergency, gangmen should have definitely allotted lengths to patrol, they should also be provided with better lights to enable them to detect danger spots.

(5) A historical record of districts should be carefully kept up-to-date and such records should form part of handing over papers of the District Engineers.

(6) A larger culvert should be built at mile 227|19 to carry off flood water in this catchment area.

EAST INDIAN RAILWAY.

DERAILMENT OF No. 302 DOWN GOODS AT MILE 498|15, BETWEEN KARCHANA AND BHEERPUR STATIONS ON 17TH SEPTEMBER 1930.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 366-T., DATED THE 27TH SEPTEMBER 1930.

In accordance with Rule 8 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I beg to submit a report on the enquiry I held into the circumstances attending the derailment of No. 302 Down Goods train at Mile 498|15, between Karchana and Bheerpur stations, East Indian Railway, at 0-50 hrs. on the 17th September 1930.

Description of Accident.

2. At 0-50 hours on the 17th September 1930, No. 302 Down Goods train was derailed at mile 498|15, between Karchana and Bheerpur. The engine and 12 leading wagons were derailed, the engine overturned and both Up and Down lines were blocked by derailed vehicles.

The driver, guard and first fireman sustained slight injuries.

3. A relief train was sent out promptly from Allahabad and both lines were cleared by about 16-30 on the 17th.

Description of Locality of Accident.

4. The line is double. The track is straight and level on a bank 7 feet high. The Down track consists of 85 lbs. D. H. rails with chairs on wooden sleepers.

Conclusions.

5. The derailment was due to wilful damage, one rail on the left side of the down track having been removed and placed along the ends of the sleepers outside the line of chairs. This conclusion is based on the statements of Superintendent, Way and Works, Mr. Pereira and the Permanent-Way Inspector, Mr. Young, who came from Allahabad with the relief train and were the first to examine the track after the accident. The train staff did not examine the track as all available lamps were used by them in protecting the line until the arrival of the relief train.

6. There is nothing in the evidence to show by whom the rail was removed. The only significant fact is that, after the fish-bolts were removed, most of the nuts were replaced on the bolts. This would appear to indicate that it was done by trained men who replaced the nuts on the bolts through force of habit. This might apply equally to a keyman or other mechanically trained person accustomed to using bolts and nuts.

7. The matter is being investigated by the Railway Police.

8. The driver showed great presence of mind in taking immediate action to protect the Up track in spite of his injuries.

L66RB—575—3-9-31—GIPS

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SOUTH INDIAN RAILWAY.

DERAILMENT OF No. 375 UP PASSENGER (POLLACHI BRANCH) AT MILE 348/10/11 ON THE 25TH OCTOBER 1930.

FROM MR. H. DALE GREEN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, OOTACAMUND, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. S.-30/644, DATED THE 22ND NOVEMBER 1930. (3670-T.)

In accordance with Rule 7 of the Railway Board's Notification No. 1926/T, dated the 19th March 1930, and in continuation of my telegram No. 2/G./11/11/30, dated the 11th November 1930, I have the honour to submit herewith my report of the Enquiry held by me into the circumstances attending the derailment of No. 375 Up Passenger from Pollachi to Podanur, South Indian Railway, metre gauge, at mile L.-348/10-11 on the 25th October 1930 at about 18-4 hours.

2. I started my enquiry on the morning of 1st November 1930 at Kovilpalaiyam where I inspected the damaged engine and coaches. I then inspected the scene of the accident and its approaches and proceeded to Pollachi to record evidence. I continued my enquiry on the 3rd and 4th at Podanur Junction and carried out experiments with YF, F and YF (modified) class engines between Podanur and Pollachi on the 8th, 9th and 10th November.

3. The District Officers of the Railway and the Government Railway Police Inspector attended the enquiry.

Description of the Accident.

4. On the 25th October, No. 375 Passenger train left Pollachi at 17-38 hours (8 minutes late) for Kovilpalaiyam. Between miles L.-348/10 and miles L.-348/11, while going round a left hand 3° curve, the engine and tender of ' YF ' class engine No. 3 capsized, at about 18-4 hours, to the left on the inner side of the curve. The left wheels of the engine were between the rails. Two passenger bogie coaches Nos. V. T.-136 and V. T.-395, went off at a tangent to the right and passed the tender and engine. The front of the leading coach, after colliding with the left corner of a hut and demolishing a gang tool box, killed a woman near the hut and injured a buffalo. It then came to a stand about 170 feet beyond the rear of the tender of the engine and about 45 feet to the right of the track. The third bogie coach No. BTC.-60 came to a stand at an angle of about 30° across the track to the right of the tender and rear portion of the engine. The fourth bogie-third coach No. BTC.-30 came to a stand with its centre portion against the rear end of the third coach and pointing at an angle of about 30° away from the inner side of the curve. None of these coaches capsized but their wheels were deeply buried. The leading bogie of the fifth coach V. F. S.-15 was derailed with the wheels just off the rails. The rear bogie wheels of this coach remained on the track. This coach was undamaged except for the front coupling. The remaining three bogie coaches of the train V. T.-90, BT.-421 and V. T. B.-58 all remained on the track and were in no way damaged. The first three coaches were damaged on their left hand side and the fourth one only slightly damaged on right side.

5. The track was torn up for a distance of about 80 feet behind the engine, the right outer rail of the curve being pushed outwards and the inner rail being badly distorted and pushed at right angles inwards. The track for a distance of 50 feet further back was also slightly distorted and pushed outwards about 2 feet. The remainder of the track was practically undamaged though the sleepers showed in places slight, though distinct, marks of one pair of derailed wheels.

6. The train was fully vacuum braked throughout, and the tonnage behind the tender was 158 tons 5 cwts. against the authorised load of 160 tons.

7. The driver and one fireman escaped injuries but the second fireman was killed instantaneously through being caught underneath the capsized tender. Only one passenger who was in the leading coach complained of slight injuries. He left by road for Podanur where he received medical attention at the Railway Hospital. The total number of passengers in the train was 24 third and 3 second class, and very few of these were in the four leading coaches.

8. The Railway Medical Apothecary, Udamalpet, and the Traffic Inspector, Dindigul, arrived at the site of the accident at 20-35 hours and the Station Master, Pollachi, who took the Local Medical Practitioner along with him arrived there at 21-0 hours.

9. The Break Down Special from Podanur arrived at the accident spot at 23-50 hours with the District Engineer, District Medical Officer, Assistant Traffic Superintendent and Departmental Inspectors with necessary staff.

10. The engine and two carriages of No. 838 Passenger train, which was waiting at Kovilpalaiyam to cross No. 375, were despatched to the site of the accident, arriving there at 20-35, to render any assistance and to tranship any passengers who were waiting there. Transhipment of passengers was immediately established and was continued until a temporary diversion was laid and through running introduced on the 27th afternoon at 16-30.

11. Rain had fallen on this section of the line almost every day from the 2nd to the 25th October, the rainfall on the 24th being 2·01 inches, on the 25th 0·38 inches, and on the 26th 0·11 inches.

Description of the locality of the accident.

12. From Pollachi to Mile L.-348/10-11 the line is in undulating country, the steepest grade being 1 in 70 and the sharpest curve 4°. Approaching the site of the accident, the line rises with a grade of 1 in 70 to mile 347½, from there after a short bit of level it falls first with a grade of 1 inch 142·85 to a point 3,826 feet from the site of the accident. It then continues to fall with a grade of 1 in 70 to the site of the accident and beyond. There is a 3° left hand curve on the 1 in 70 grade commencing from about 1,100 feet behind the point where the engine capsized. At the site of the accident, the formation is practically on ground level. The soil in this part is firm red earth with a mixture of kunker.

13. The track consists of 41¼ lbs. F. F. rails 30 feet long with 11 hardwood sleepers per rail length.

The curve is double-spiked. Where the large pattern bearing plates are in use there are 8 coach screws per sleeper but in a few places where a smaller pattern of bearing plate is in use there are 6 coach screws per sleeper.

The line is fully ballasted with an ample supply of mixed broken kunker and granite ballast about 6 to 8 cubic feet to the foot-run. There is some mixture of earth with this ballast.

The 3° curve is laid to a ¼ inch slack gauge and with a super-elevation of ¾ of an inch.

14. Though there had been almost continuous light rain with occasionally heavy showers from the 2nd to the 25th October, the formation at the site of the accident, owing to the firm nature of the soil, was neither softened nor disturbed. This rain, however, very probably made the packing in the track a bit soft in isolated places where there may have been a greater admixture of earth in the ballast. The appearance of the track both ahead and in rear of the accident site was uniformly good and the gauge and super-elevation, which were checked by me, were also remarkably regular.

15. The wooden sleepers in the track date from 1915 to 1930. Of these, 75 per cent. are less than 7 years old. A number of the sleepers had, however, been marked for renewal in the next quarter and some of these sleepers which were damaged during the accident showed that they had worn thin and had also been eaten badly by white ants, which are a source of trouble on this section.

Detailed statement of the evidence taken.

16. *Time.*—The train left Pollachi station at 17-38 hours, *i.e.*, 8 minutes behind schedule time.

The time of the accident is stated to be about 18-4 hours by both the Driver and the Guard.

17. *Load of train.*—The normal load of trains on this section is 6 bogies. The load of the train was 8 passenger bogies totalling 158 tons 5 cwts. The maximum load laid down in the Working Time Table for Y. F. class engines on this section is 8 bogies with a gross load of 160 tons.

18. *Vacuum.*—The train was worked with vacuum brakes throughout and the vacuum throughout the train was tested before leaving Pollachi station and found to be 19 inches and in thorough working order. The engine is fitted with a " Dreadnought " Ejector and the driver states that he had no difficulty in maintaining vacuum on the journey. The guard also states that he observed the Driver applying the brakes slightly about half a mile away from the accident steadying the train down the grade. There is, therefore, no reason to suspect that the train had got out of control down the grade of 1 in 70 through failure of the vacuum brakes.

19. *Speed of the train.*—A gang-mate who was travelling on the train states " When the train reached L.-348/10-11 (the site of the accident) it was running at a faster speed than usual ". The keyman of the section who happened to be at the very site of the accident, putting his tools away in the tool-box provided there, says " From the sound of the train as it was approaching I judged that it was going fast ". When giving his evidence this witness appeared to have a vague idea of speed. The gang maistry of the adjoining section who was walking along the track towards the approaching train and first noticed the train from a distance of two telegraph posts says " I thought at the time that the train was travelling faster than usual ". A Pump Fitter, who was travelling in the leading coach, states " Before the accident I did not hear any passengers in the carriage remark that it was going at excessive speed, but after the accident the passengers who got down told me that the accident appeared to have occurred through excessive speed, but I told them that it was only because the carriage was rocking that it appeared so ", and further " There was no rocking before we passed the engine ". Pump Cooly who was also travelling in the first coach says " I do not know what speed we were going, but the train was travelling slowly ". The Guard of the train states that " The speed of the train was normal, *i.e.*, not more than 20 miles per hour " and he also noticed that the driver was " applying the brakes slightly about half a mile from the site of the accident steadying the train down the grade ". The driver himself states " I think I was travelling at less than 20 miles per hour. There was no necessity for me to exceed the speed limit as there is plenty of time allowed between Pollachi and Kovilpalaiyam ". I am of the opinion that the most reliable evidence of the above witnesses at the accident points to the fact that the driver did not exceed the maximum speed limit of this section, *viz.*, 20 miles per hour, and that, if he did so, it was not by much, and not wittingly or intentionally. I am further confirmed in this opinion by the fact that this driver has an exceptionally good Service Record and that he has not been punished for any serious offence, nor for driving at excessive speed. The Loco. Foreman of his depôt also states that he selected the best drivers working on this section for the new engines. The Guard of the train also corroborates the statement of the foreman and states that this driver does not make up any time on Loco. account.

20. *Permanent way.*—I have already in my " Description of the locality of the site " given full details of the material in the track and information regarding its maintenance, and allowances for the 3° curve, and have pointed out the almost continuous and exceptional rain from the 2nd to 25th October, but in spite of this the formation was not softened nor disturbed. The sleepers, the coach-screws (double throughout the curve) and the rails and fastenings were complete.

21. I attach no importance whatever to the evidence of the Permanent Way Inspector that one pair of fish-plates could not be found after the ac-

cident. No oiling of fish-plates was in progress, and I have no reason to suspect malicious tampering with the track in broad daylight in the immediate vicinity of huts where some of the maintenance staff were living. I am of opinion that the pair of fish-plates not accounted for have either been lost or otherwise removed with the wreckage after the accident.

22. The line was well and amply provided with sound ballast of about 6 to 8 cubic feet per foot-run. There is, however, an admixture of earth with the ballast which may have been softened or washed out, and where this was in excess may have caused isolated soft patches in the track. The wooden sleepers which were fitted with bearing plates were on the whole up to requirements, but I have explained that some of those which were marked for renewal during the next quarter were worn thin and had been badly eaten by white ants. There is evidence to show that the track was well patrolled and inspected by the Gang Maistry, Keyman, Sub-Inspector and Permanent Way Inspector. The driver of the train on his outward journey at about midday found the track all right; the driver of a preceding train which ran about 4 hours before the accident is of the same opinion, and this is further corroborated by the driver of another train which passed only $2\frac{1}{2}$ hours before the accident and in the same direction, and by the guard of the train on his outward journey.

23. The material and maintenance of the track is therefore in my opinion, on the whole well up to the requirements of this section where the heaviest engine axle load is 8·6 tons and the maximum permissible speed 20 miles per hour. (The heaviest axle load of the new YF engine is 8·15 tons.) There may, however, have been an unnoticeable soft place on this curve, due to a bad sleeper or two or loosening of ballast, which may have contributed to this derailment.

24. *Rolling Stock.*—The Rolling Stock was examined by the Rolling Stock Fitter at Pollachi, from where the train started, a few minutes before the accident. Apart from broken axle boxes the running gear of the stock was not damaged during the accident, and the stock was run to Kovilpalaiyam after the accident on their own wheels. I am of opinion that none of the rolling stock is responsible for the derailment.

25. *Nature of Derailment.*—The description of the accident shows how certain coaches immediately behind the engine shot past it to the right, tangentially to the curve. Judging from the evidence of some of the passengers travelling in the two leading coaches, the direction taken by the two leading coaches to the right, and the fact that the leading coach had its panelling and other parts of its body and underframe were damaged on the left side, I am strongly of opinion that the engine was the first to leave the track and that it tilted rapidly to the left, breaking the coupling between the tender and leading coach.

26. The very first sign on the track of a derailed wheel is about 255 feet behind the engine. The mark is on the head of one of the inner coach screws of the outer rail of the curve. The marks which follow on the sleepers are very light and on the inside of the outer rail of the curve. I do not think that these marks of derailment were made by the engine or tender which derailed towards the outside of the curve. They may have been caused by the derailed wheels of the leading bogie of the fifth coach which may have come off the track as the result of the repercussions which took place after the first shock of the derailment of the engine. Measurements of the coaches ahead would indicate that the driving wheels of the engine came off just beyond the Level Crossing and within a distance of about 100 feet where the engine capsized. The check rails of the Level Crossing were in good order after the accident.

27. The driver of the train states " On arriving at mile 348/10 I felt, and also noticed, the engine leaning on the left side " and " after passing about 3 bogie distance the engine began to move in a slanting position when I applied full vacuum by the left hand, holding the stanchion by the right hand, when the engine derailed on the left side and stopped ". He also states " I am quite certain that it was from mile 348/10 that I felt the engine leaning on to the left. At that time I heard no noise of a derailment and felt no rough riding. The engine then suddenly leaned over more and fell on its side. This last movement of the engine took place after passing the Level Crossing

and happened within a second or two ".

28. Mile 348/10 is only 118 feet from the Level Crossing, and I therefore come to the conclusion from all the above that the derailment of the driving wheels of the engine took place just beyond the level crossing. The coaches too would not have got practically clear of the tender, along the tangent, if the derailment of the tender was not very sudden. The left side of the tender shows distinct marks of having slid along the ground. This indicates that it had fallen suddenly while in motion and slipped along the ground a few feet on its side.

29. *Y. F. Class Engine.*—I examined Engine Y. F. 3 after the accident and it was in running order. The leading notched cotter of the left spring hanger of the radial wheel was missing. I do not think this cotter dropping out was the cause of the accident but rather the result of it.

30. Three engines of this new type were supplied for work on the Podanur Division and arrived at Podanur on the dates shown under :—

Y. Fs. 1 and 3	19th October 1930.
Y. F. 5	24th October 1930.

The Loco. Foreman, Podanur, states " the engine concerned in the accident, Y.F. 3, was on her fifth trip since her arrival, and that none of the drivers of these engines had complained to him about these engines; he was surprised after the accident to hear some talk of rough riding for the reason that he had received no previous complaint. The Loco. Foreman positively denies any complaint made by the driver of Y. F. 3 and the statement made by this driver that he had entered a remark in his journal has not been confirmed. This driver stated in his evidence that the Y. F. engine ran steadily on Up grades but on down grades it rocked badly. Also on curves, it rocked badly at 15 to 20 miles an hour, and that he had to lose time to prevent rocking." The two other drivers using this class of engine corroborate the statement of the Foreman.

31. The District Mechanical Engineer, Podanur, informed the Deputy Power, Trichinopoly, by demi-official letter on 2nd November 1930, after the accident, " I have made three trips on a Y. F. class engine between here and Pollachi and have to report that the running of these engines on this section is extremely bad as they have a most peculiar motion owing, I think, chiefly to the fact that the centre of gravity is high and that they have a radial wheel under the cab with all springs on the engine fully compensated. The motion can only be described as appearing to be something like a cork-screw." He also states that the bad running of the engine may be due to the track.

32. After my first day's enquiry, when returning to Podanur, I rode in the cab of a Y. F. class engine with the District Mechanical Engineer and the motion of the engine on a down grade round a curve at a little over 20 miles per hour appeared to me exceptional, a combined forward and lateral cork-screw-like lurching. I therefore decided to experiment with a track recorder on this section with both Y. F. and F. class engines. Just before I was able to make further trial trips and experiments with these engines, the Chief Mechanical Engineer, South Indian Railway, who came to witness them, brought with him copies of some correspondence, which showed that the Assam Bengal Railway had represented to the Loco. Standards Committee the " pitching " and " hunting " which is reported to occur on the above type of Y. F. class engine at speeds in excess of 25 miles per hour, and that the Loco. Standards Committee had instructed the Loco. Superintendent, Bombay, Baroda and Central India Railway, and the Loco. and Carriage Superintendent, Eastern Bengal Railway, to reduce the lateral motion of the hind truck from $4\frac{1}{2}''$ to $2''$ and to eliminate compensation of the leading wheels. Instructions were also issued by the Chief Controller of Standardisation to the Assam Bengal Railway and the South Indian Railway to modify the hind truck Cortazzi slides on 2 Y. F. engines for trial. The above modification had just been carried out on one Y. F. engine on the South Indian Railway and it was also sent up for trial. It was pointed out to me that the centre of gravity of the Y. F. engine is about $10\frac{1}{2}$ inches higher than the old F. class.

33. My own experience when riding on the engines, and the results of experiments are that the running of the Y. F. engine, especially on down grades at about 20 miles per hour, is much rougher than that of the F. class engine; that though there is an improvement in the Y. F. class (modified), it is still much rougher than the F. class engine, and I am of opinion that further modifications are necessary.

Recommendation.

34. As I have come to the conclusion that the chief cause of the derailment to the passenger train was due to the rough running caused by defects in design of the Y. F. class engine, I strongly recommend that the question of improvements should be gone into fully before further engines of this type are manufactured.

I have meanwhile restricted the maximum speed of this class of engine to 20 miles per hour when running engine foremost and to 15 miles per hour when running tender foremost.

BURMA RAILWAYS.

DERAILMENT OF No. 4 DOWN MAIL AT MILE 144/17 BETWEEN SIBINTHA AND NYAUNGCHIDAUK ON THE RANGOON-MANDALAY MAIN LINE ON THE 28TH OCTOBER 1930.

FROM MR. R. HATT-COOK, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, RANGOON, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 955/24/A, DATED THE 21ST NOVEMBER 1930. (3669-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I submit herewith the report of the enquiry held by me into the circumstances attending the derailment of 4 Down Mail at mile 144/17 between Sibintha and Nyaungchidauk on the Rangoon-Mandalay Main Line on the 28th October 1930 at 1-50 hours.

I held my enquiry at Toungoo on the 2nd and 3rd November 1930. The following Officers attended the Enquiry:—

G. A. Hicks, Esq., Chief Engineer, Burma Railways, Rangoon.

J. Johnson, Esq., Loco. Superintendent, Burma Railways, Insein.

L. T. Wilson, Esq., Superintendent of Railway Police, Rangoon.

F. L. F. Boeddicker, Esq., District Loco. Superintendent, Toungoo.

A. R. Gawthorne, Esq., District Engineer, Burma Railways, Toungoo.

A. F. Fitzherbert, Esq., District Traffic Superintendent, Toungoo.

Dr. J. G. H. Davidson, M.B., Ch.B., District Medical Officer, Toungoo.

U. Saw Hla Pru, Esq., Deputy Commissioner, Toungoo.

C. Kluseman, Esq., Deputy Superintendent of Railway Police, Rangoon.

G. W. R. Strickland, Esq., Assistant Engineer, Burma Railways, Toungoo.

H. J. Palmer, Esq., Assistant Loco. Superintendent, Burma Railways.

Description of the Accident.

I received a wire from Station Master, Naungchidauk, about 7-30 hours on the morning of the 28th and proceeded by first train to the site to make my investigations. The accident happened at mile 144/17 between Sibintha and Nyaungchidauk on the Rangoon-Mandalay Main Double Line at approximately 1-50 A.M. on the 28th October. The train concerned was 4 Down Mail. On my arrival at the site at about 7-30 A.M. on 29th the down line had been repaired and 4 Down of 29th had been passed over it. The up line throughout had not been blocked by wreckage, and traffic was passed over this line as expeditiously as possible. The District Engineer shewed me 4 fish bolts and nuts, 2 fish plates and 12 spikes which he stated were found shortly after the accident by the Chief Secretary to the Local Government and Mr. Evans, an Engineer in a Rangoon Firm, who were passengers on 4 Down Mail, lying undamaged under the last derailed coach. This information was also certified by Finance Member and Home Member of Local Government who were also passengers on 4 Down. The District Engineer and Permanent Way Inspector also saw the bolts, etc., lying some between the track, some outside, the spikes being neatly placed alongside and outside the dismantled joint, later on a claw-bar, one fish plate and one fish bolt without nut were found just outside the fence and about 25 feet east of the down line and opposite the dismantled joint. These fittings were quite undamaged, the fish bolt threads were in perfect order, with their nuts removed at site, fish plates were unbent in any way and the spikes had been drawn by a claw-bar as new and bright marks were observed under the heads which incidently

fitted the found claw-bar. This dismantled joint was 21′ south of the south abutment of Bridge No. 224, $5 \times 10'$ span girders. From the evidence of passengers and the District Engineer the next joint north which was on the Bridge approximately 15 feet from the south abutment had also been tampered with, for it was discovered that the 4 fish bolts had been slackened off and one spike had been removed from an adjacent sleeper, which was found later in the bed of the river with fresh bright claw-bar marks on it. This joint had evidently been abandoned as the fish bolts could not be removed easily as they were jamming hard against the spikes. The train wreckers most likely found it difficult to remove spikes on the Bridge and concentrated on the joint which was completely dismantled. It was evidently intended to remove this rail length complete.

No. 340 Down Goods Train passed this site safely at approximately 1-10 hours, and both the driver and guard felt no unusual lurch nor did they see anybody about. It appears therefore that the wreckers had about 40 minutes to do their job.

The engine (an express passenger six coupled) and tender did not derail but the Driver felt a definite bump which he described like running over a spike and he heard a noise like a spring dropping on the track. He at once shut off steam and applied his brake and pulled up in 435 feet from that spot. The leading four-wheeled luggage van and bogie brake together with 7 bogie passenger coaches derailed, four of which capsized, the others being canted over. The six following bogie vehicles remained on the track. Two passengers were killed, one second class and one third class, who were in the last two derailed vehicles which telescoped. Seven passengers were injured, two of whom were stretcher cases. It is since learnt that one of these has died. The remaining five passengers had slight injuries and proceeded on their journey after treatment. The two stretcher cases were taken to Pyu Hospital accompanied by the District Medical Officer, Toungoo, and subsequently taken to Rangoon in the Ambulance carriage of the Special Train. The two dead were handed over to Railway Police and taken to Pyu. Several other passengers complained of bruises but did not wish to be detained and proceeded to Rangoon.

The left hand rails along the site of the accident which were pushed forward about 12 feet, were badly buckled and were carried away about 25 feet from the centre of the track. The right hand rail all along the site remained intact. The running surface of the second rail south of the dismantled joint was scored and marked with red lead paint as if something painted with red lead had been dragged heavily along it. This was later found to be the left side leading bogie arch spring bar of the third vehicle and it is this vehicle which I conclude was the first to derail, at the dismantled joint for the tyres were badly indented and scored and there was a flake of steel (burnt blue) still standing up from the tyre when I inspected it. The horn blocks and undergear were badly knocked about and burnt blue owing to severe friction against the rail.

Several high Government Officials were travelling on the train. There were 292 passengers of whom 17 were first class passengers, 25 second class and 250 third class. The total weight of engine and train was 350 tons exclusive of passengers and baggage.

The headlight was in good order and nothing wrong with the permanent way was visible to the driver and nobody was seen about. The driver neither saw nor heard cars on the Public Works Department Road about a furlong off running alongside the railway nor did the Station Masters at Nyaungchidauk and Kywebwe.

The weather was fair and the night was dark as the moon had sunk.

Description of the locality.

The site of the accident is 144/17 miles from Rangoon on the double line. The line was doubled in 1926 and the down line is the doubled line. 4 Down was proceeding south towards Rangoon between Sibintha (Mile $145\frac{3}{4}$) and

Nyaungchidauk (Mile 143¼) stations. For about 3 miles north of the accident the track is dead straight. About ¼ mile south of the accident there is a short left hand 1° curve. There is a down gradient of 1 in 1,000 and 1 in 500 for three quarters of a mile, then level for quarter of a mile to the site of accident. The track runs on a bank about 5 feet high. Immediately north of the site there is a well constructed masonry bridge No. 224 of $5 \times 10'$ span girdars, the track running on the top boom on good sound sleepers well fastened down, the girders and bearings were in good order. The track north of the site was in good condition and regularly maintained. The track is composed of 60 F. F. steel rails without bearing plates on sound teak sleepers laid in the year 1926, each rail being spiked to each sleeper by means of two spikes. The track is well ballasted. In the vicinity of the bridge about 100 feet either side there are no bushes or shrubs. Beyond this either side there is the ordinary scrub jungle, not very thick. The nearest gang hut is approximately ¾ mile away.

Conclusions.

From the evidence obtained very shortly after the accident from passengers of 4 Down who were eye-witnesses to the dismantled joint and from the Permanent Way Inspector and subsequently the District Engineer, I conclude that the cause of the accident was due to the dismantling of the joint just south of Bridge No. 224 by some person or persons unknown. Twelve removed spikes were found, 8 lying neatly placed at the joint and 4 between rails. The short rail south of the dismantled joint had only 8 sleepers and two spikes per rail per sleeper, therefore it appears that all the outer spikes of the left hand rail were removed and four on the inner side of this rail as the right rail was intact and so also the left rail north of this joint. This cannot be definitely proved because the sleepers of this short rail were badly bunched up and knocked about and they were not preserved apart from other sleepers by the Permanent Way Staff for investigation purposes. The tampered joint on the Bridge would have caused little or no oscillation to the engine as it was closely supported on sound timbers resting direct on the girder and no joint spikes were removed. The dismantled joint with the outside support of the rail removed was undoubtedly the direct cause of the accident. The engine and probably the two following vehicles kept the track owing to the grip of the remaining four spikes on the inner side of the rail, the friction between the foot of the rail and the sleepers, and the rail cant, also the trailing wheel of the preceding vehicle (which would have been on this rail by about 5′ from the forward joint) steadying it thus keeping the rail in a straight line for the passage of these vehicles. When these forces had been overcome the leading left bogie of B. T. C. 9566 derailed at this joint forcing this rail outwards, by sliding along the inner edge which pivoting on its forward joint, broke it open, freeing the short rail length, and shifting the next rail ahead outwards, causing the arch spring bar of this bogie to slide on the top of this rail (indicated by red lead paint) until this got pushed forward and buckled, together with the rails in advance. Several fish bolts were found in two pieces evidently broken due to tension on the joint. I conclude that the first two vehicles after the tender, kept the rails to a point approximately two rail lengths further south, where there were distinct marks on the sleepers of vehicles coming away from the track and continuing between rails. These two vehicles remained partially between the rails, the following vehicles did not.

The leading left hand bogie wheels and axle guards of the third vehicle B. T. C. 9566 suffered badly, and were heavily indented, burnt and scored. In certain ways this accident bears an extraordinary resemblance to the accident to 4 Down Mail on 28th January 1928. So that it may be the same gang at work again. The criminals could not have been far off when the train crashed and in obtaining evidence I endeavoured to find out whether any suspicious looking persons of outsiders had arrived by train the preceding evening or whether any motor cars had been heard on the road during the hours immediately before and after the accident. The information was not forthcoming.

I consider the driver acted with promtitude, for directly he felt the bump he shut off steam and put on his brakes although he had no indication that anything was wrong with the track, and saved a total disaster for which he is to be highly commended, for he pulled up his train in 435 feet from the dismantled joint at a probable speed of 35 miles per hour. I have no reason to think that he was travelling at an excessive speed, the maximum permissible for this section is 40 miles per hour.

General.

The Accident Special left Toungoo at 4-12 hours and arrived at Kywebwe at 4-48 hours and was stabled there until required. The Pyuntaza Accident Special left at 4-28 hours and arrived Nyaungchidauk at 6-30 hours. The 30-ton Steam Crane which was sent out from Insein left at 8 hours and arrived Nyaungchidauk at about 14-50 hours. Incidently this 30-ton Steam Crane did most of the work, the 10-ton cranes proving most disheartening to work with on heavy bogie stock. They should be taken off Accident relief Specials altogether. This would entail the supply of modern steam cranes to suit the particular section in which they would work, and such cranes are strongly recommended. The Ambulance Special left Rangoon at 5-30 hours and arrived Nyaungchidauk at 11-45 hours. A field telephone instrument was fixed in position at site of accident at 7-55 A.M. The Down Line was cleared of wreckage by 1 A.M. on the 29th. Thus all arrangements for clearing the line, passing traffic, and attending to the injured were very satisfactory.

The statements of the Government Officials and an Engineer in a Rangoon Firm travelling on the train are most important and proved beyond doubt that it was a case of deliberate train wrecking. No reasons can be assigned for this object, as there was no subsequent dacoity and there were no valuable goods on the train, *e.g.*, *Namtu Silver*. There were a few Government Officials travelling but this appears no definite reason. First Aid Equipment was on the train. The passengers were sent on to Rangoon in portions of 4 Down and 12 Down at 8-25 hours from Kywebwe.

Recommendations.

1. It would be useful in future accidents of this nature, or where the cause is unknown, to preserve damaged rails and sleepers, etc., in charge of Permanent Way Staff, intact. This should help to solve certain problems which are generally met with on such occasions.

2. The guard was not provided with efficient lights in his brake van and it would be advisable to have better lights carried with the more important trains.

3. Steam Cranes are strongly recommended for Accident Relief Trains to be placed at strategical points throughout the system.

NORTH WESTERN RAILWAY.

COLLISION BETWEEN No. 33 UP MIXED TRAIN AND A MOTOR BUS AT A LEVEL CROSSING, MILE 16/11, BETWEEN NASRALA AND SHAM CHAURASI ON THE 15TH NOVEMBER 1930.

FROM MR. J. SCRUBY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. T./21, DATED THE 12TH DECEMBER 1930. (3691-T.)

In accordance with Rule (8) of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I submit herewith a report of the enquiry held by me into the circumstances attending the above-mentioned accident.

2. The enquiry was held by me at Nasrala Station on 19th November 1930 in the presence of the officers of the Ferozepore Division of North Western Railway. The Inspector of Police, Hoshiarpur District, and the Railway Police official of Jullundur City also attended.

Description of the accident.

3. On 15th of November 1930 at about 13-30 hours whilst 33 Up Mixed Train was travelling over the level crossing provided with gates at mile 16/11, between Nasrala and Sham Chaurasi on the Hoshiarpur branch line, a Chevrolet 6 cylinder motor bus, No. P-1338, carrying six persons including the driver proceeding in the direction from Jullundur to Hoshiarpur burst through the level crossing gates and came into collision with the tenth and eleventh vehicles of the train travelling in the direction of Nasrala to Sham Chaurasi.

4. The composition of the train was:—

Engine SG No. 1132.
8 Goods vehicles.
1 Brake Van.
1 Composite ordinary 1st and 2nd class.
3 Bogie 3rd class.
1 Composite bogie Inter and 3rd class.
1 Brake Van.
3 Goods vehicles.

The train was vacuum braked throughout.

5. As a result of the collision the motor bus was completely wrecked. It came to rest in an inverted position parallel to the railway, about 33 feet clear of the level crossing in the direction the train was moving and about 10 feet clear of the centre of the track, with its radiator pointing in a direction opposite to the movement of the train.

6. One leaf of the level crossing gate was smashed and the other leaf damaged.

7. The tenth and eleventh vehicles (coaching stock) of the train were damaged in respect to running boards, hand rails, pannelling, and a window.

8. The following were the casualties among persons travelling in the motor bus:—Two men, one of whom was the driver, were instantaneously killed. Two men received injuries and were rendered unconscious. One woman received superficial wounds.

9. The remaining passenger of the motor bus ran away and has disappeared.

10. No passenger in the train was injured.

11. The injured persons received temporary aid from the train running staff and were conveyed by the same train to Adampur Doaba at which station

they were taken on charpoys and in a country cart by railway staff to the Civil Dispensary for further treatment. They were then conveyed by motor vehicle to Hoshiarpur, examined and treated by the Medical Officer-in-Charge, and finally taken away by their friends and relatives on the same day.

12. The two dead bodies were taken away by the District Police on the same evening and made over to relatives.

13. The train suffered a detention of 42 minutes at the site of accident after which it proceeded on the journey terminating at Jullundur City.

14. The two damaged vehicles were detached and detained at Jullundur City.

Description of locality of the accident.

15. The site of the accident was inspected on 19th November 1930.

16. In the following description the direction of the railway line is viewed from Hoshiarpur Station to Jullundur Cantonment Station. The direction of the road is viewed from Jullundur City to Hoshiarpur Town.

17. The railway approaches the level crossing at mile 16/11 around a curve leading to a straight of approximately three quarters of a mile and 500 feet on the Hoshiarpur and Jullundur sides of the level crossing respectively.

18. There is a clear view for three quarters of a mile of the level crossing in approaching it on the railway from the Hoshiarpur side, but road traffic approaching the level crossing from Jullundur is obscured from this direction of view by an avenue of trees along the road.

19. The gradient of the railway is 1 in 300 Down approaching the level crossing from the Hoshiarpur direction, to a point one-third of a mile distant on the Jullundur side.

20. At the level crossing the railway is carried on low embankment of about two feet height.

21. Whistle boards are erected at a distance of 576 feet on either side of the level crossing.

22. The Public Works Department road approaches to the level crossing from Jullundur is a long straight bearing left at a distance of 400 feet from the level crossing, running parallel to the railway for a distance of 250 feet, after which it bends right and crosses the railway at an angle of 60° with a reverse curve. An open view of the railway and level crossing is obtained for a distance of about 400 feet from the level crossing and the imminence of the railway line is obvious from a much greater distance. On the far side of the level crossing from the end of the reverse curve the road continues straight.

23. Looking along the road from a point about $\frac{1}{4}$ mile on the Jullundur side of the level crossing an impression is given that at one period the road took a straighter alignment west and east of the level crossing, and that the bends and curves mentioned in the foregoing are of later date, probably put in to obtain a better angle of crossing over the railway.

24. The road approaches the level crossing from the Jullundur side on an easy up gradient combined with a short shallow dip and continues with a very gradual fall in gradient on the other side.

25. A conventional red triangle warning is erected on the side of the road at a distance of 320 feet on the Jullundur side and 444 feet on the Hoshiarpur side of the level crossing.

26. The level crossing closely follows the Railway Board's specification for A Class. It is provided with double leaf gates opening away from the railway line giving a clear opening of 18 feet between gate posts.

One leaf of the gate on the right hand side of the railway was smashed and the other leaf damaged as a result of the accident.

27. The level crossing is manned by two gatemen with specified hours of shift duty throughout the day and night.

28. The condition of the level crossing surface and approaches was good.

29. The equipment of the level crossing was in order with the exception of one gate lamp which was deficient in one red glass.

30. The wrecked motor bus was in a position about 33 feet clear of the level crossing on the Jullundur side and about 10 feet clear to the right hand side of the centre line of the railway.

31. There is a considerable amount of motor traffic along the road, chiefly of the motor bus category plying between Jullundur and Hoshiarpur.

32. On this branch line there are three up and three down trains each day. The maximum speed allowed on the section is 25 miles per hour.

Conclusions.

33. In my opinion the motor bus was out of control, crashed through the level crossing gate, collided with the train and in so doing was the cause of the loss of life and injury to persons and property dealt with in this report.

34. The evidences of one passenger of the motor bus, the guard of the train, the driver of the train, and the gateman, show that the level crossing gates were closed for the passage of the train.

The evidence of the guard and driver also goes to show that the gates were padlocked.

I, therefore conclude that the gates were properly closed and padlocked against road traffic for the passage of the train.

35. From the evidence of the motor bus passenger, the driver of the train and the gateman, together with my previous conclusion that the gates had been padlocked, I am satisfied that the gates were not closed dangerously and immediately in the face of the approaching motor bus.

I, therefore, conclude that the gateman is in no way responsible for the accident.

36. From an inspection of the site I find that road traffic approaching the level crossing from Jullundur is obscured by an avenue of trees along the road from the view of the driver of a train approaching the level crossing from Hoshiarpur. Furthermore evidence is given to the effect that the train driver was given a green flag signal from the level crossing. I conclude that the train driver would not be able to see the motor bus approaching, nor could he have averted the collision, and is therefore in no way responsible for the accident.

37. The evidences of the motor bus passenger, the gateman, together with the damage done to the level crossing gates and the vehicles of the train all go to show that the motor bus was travelling at a high speed and either driven in a reckless manner or was out of control.

I conclude the responsibility of causing the accident rests entirely with the driver of the motor bus, who has forfeited his life through his recklessness or negligence.

38. The evidence as to where the train came to rest after the accident is not consistent, the distance varying from 150 feet to 1,100 on the Jullundur side of the level crossing. I am of the opinion that the train was brought to rest with the rear vehicle of the train about 900 feet distant from the level crossing on the Jullundur side.

39. I find that although the guard of the train had passed in First Aid and had a First Aid Box in the Brake Van he did not make use of the First Aid Box, but bandaged the injured with material from his turban and handkerchief.

40. The license for the motor bus is in favour of a person other than the driver. The licensee should therefore be liable for damages incident to the collision.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

COLLISION BETWEEN 131 UP SPECIAL SERVICE TRAIN AND A MOTOR BUS ON LEVEL CROSSING No. 207, MILE 318/14, NEAR MHOW STATION ON THE 16TH NOVEMBER 1930.

FROM MR. G. W. N. ROSE, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1893, DATED THE 29TH NOVEMBER 1930. (3689-T.)

In accordance with the orders in Railway Board's Notification No. 1926-T., dated the 19th March 1930, I beg to forward my report on the above accident.

2. I was unable to reach Mhow before the 25th November and having inspected the site and read the evidence recorded at the District Officers' inquiry of the 20th, however, it was clear that the latter had fully brought out the true sequence of events, and I did not therefore consider it necessary to have the witnesses recalled for further examination.

Description of accident.

3. At about 9-50 hours on the 16th November 1930, No. 131 Up Special Service (Indore-Mhow local) passenger, running south-bound from Indore to Mhow, collided on level crossing No. 207 with a motor bus No. H. S. 841, which was crossing the line from west to east, *en route* from Mhow to Indore. Of 19 persons (including the driver), in the bus, 5 were killed on the spot, and 14 injured, of whom 6 have since died in hospital.

Description of site and circumstances of accident.

4. Level crossing No. 207, mile 318/14, is between Rao and Mhow stations, being about half a mile north of the latter. Level crossing No. 206 is some 1,400 feet north of No. 207, and a further quarter mile away is bridge No. 617, over which a restriction of 10 miles per hour is in force. Running southwards from Rao, the line after falling about 70 feet in three miles continues level for a mile to bridge No. 617, and onwards, with a left-hand curve between the bridge and level crossing No. 206, whence it runs straight from north to south into Mhow station, with rising grades of 1 in 400 and 1 in 194 between the two level crossings.

5. Both crossings are provided with signals. That for No. 206 is 415 feet north of its crossing and is visible from well beyond bridge No. 617. The signal for crossing No. 207 is sited 850 feet north of its crossing, and comes into view round the curve from an approaching train shortly before crossing No. 206, *i.e.*, at a point about 1,050 feet away from the signal itself, or 1,900 feet short of crossing No. 207. The signals at these crossings are worked by Blood's levers and are not interlocked with the gates. The gates have double leaves on each side of the line, and are not coupled in any way.

6. The road from Mhow over crossing No. 207 runs roughly from south-west to north-east at an angle of about 30 degrees to the line. A hedge on the left, and the gate-lodge and some trees adjoining it, in the north-west angle of the crossing, prevent any view from the road from Mhow, of a train approaching from the north, except over a short length of 20 yards of road beginning at a point 40 yards short of the west side gate, where there is a gap behind the gate lodge. The road is level over the crossing, but it takes a small kink, to the left just before reaching the west gate and then to the right, so as to cross the line at a less acute angle, with the result that the gates on the far side are partially hidden from an approaching vehicle by the palisade fencing on the right of the road, and do not show up when closed on that side only, as clearly as would be the case with a dead straight road. An ordinarily careful driver would have no difficulty, however, in seeing them thus closed, well before reaching the crossing. The gates are painted white, with red discs, and the paint is in a fair state of repair.

7. Jura Khan, the gateman on duty, admits that the gate signal for up trains was duly lowered. He states that having heard the train whistle,

he lowered the signal (the lever being in front of the gate-house in the north-west angle of the crossing), closed and locked the east side gates, and was crossing the line to close those on the west, when the bus, approaching at a high speed, disregarded all his signals to stop. It swerved to the right, passed Jura Khan on his left hand side, got off the roadway and struck the Blood's lever (of the down gate signal), on the far side of the line. But for this lever, the bus would possibly have escaped the train, at the expense of dashing down a four-foot bank into the wire fence. An examination of the wrecked bus showed that the lever caught the left front wing, and that the locomotive struck it near the rear axle, while it was still foul of the track. The bus was thrown right round, the roofed body completely wrecked and the chassis buckled at the rear end.

8. The train was composed of " H " Class tank engine No. 851, followed by four bogie passenger vehicles, all vacuum braked. It was running to time. From the guard's evidence, the train was brought to a stand in about 700 feet. With the gate-signal " off " as was the case, the train crew cannot be held in any way responsible for the accident. The engine sustained only minor damages.

9. Abdulla Khan, the driver of the bus, states that the gates on both sides were open, and that he saw no gateman. I do not doubt, however, that the real situation was as described in paragraph 7 above; the evidence of several witnesses, as well as the way in which the wing was damaged by the signal lever, goes to show that the bus was being driven at a high speed right on to the crossing, and that Jura Khan's statement is substantially correct.

Conclusions.

10. Jura Khan, the gateman on duty, is primarily responsible for the accident, in that he lowered his signal for the train before he had closed the gates to road traffic.

Abdulla Khan, the bus driver, must share the responsibility by reason of the way in which he ignored the gateman's signals and the closed gate facing him, and drove on to the crossing at a high speed.

I consider that both men should be prosecuted; I understand that Jura Khan is already under arrest.

Recommendations and remarks.

11. *Desirability of interlocking.*—This accident is a case of failure of the human element, which would have been prevented by interlocked gates and signals. This work is actually in hand at these two adjoining crossings, but is unfortunately still incomplete.

12. *Hours of duty.*—The evidence shows that Jura Khan had been on duty for over 15 hours at the time of the accident. During this period he had passed 13 trains over the crossing. Two men are employed on this gate, with 12 hour turns of duty from 6-00 and 18-00 hours, which they change over weekly, by each working one turn of 18 hours. This is a bad arrangement and the change-over should be made in some less objectionable manner.

13. *Road warning signs.*—These have not been provided, and should be arranged, as the road is a busy one with much motor traffic, between Mhow and Indore on the Bombay-Agra trunk route. The gates are left normally open to road traffic and closed to pass trains, which average about 23 daily in the present slack season.

14. No first-aid equipment was carried on the train. It was fortunate that medical aid, ambulances, etc., were available at Mhow so close at hand, and that a doctor, Lieutenant E. Ardeshir, I.M.S., was a passenger on the train. The District Officers' Committee, one of whom, Mr. W P. Harrold, District Traffic Superintendent, Mhow, was on the scene very shortly after the accident, brings specially to notice the assistance rendered by Lieutenant Ardeshir in giving First Aid and in calling for Military ambulances and other help, so that it was possible to send all the injured to the City Hospital within 30 minutes of the accident.

BENGAL NAGPUR RAILWAY.

A TROLLY ACCIDENT AT MILE 258/15-16, NEAR ROURKELA STATION ON THE BIRMITRAPUR BRANCH ON THE 22ND NOVEMBER 1930.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1036/XIII/31, DATED THE 13TH MAY 1931. (3694-T.)

With reference to Rule 7 of the Railway Board's No. 1926-T., dated the 19th March 1930, I beg to submit my report on the trolly accident at mile 258/15-16, on the 22nd November 1930, near Rourkela Station on the Birmitrapur Branch of the Bengal Nagpur Railway.

2. An Officers' enquiry was held on the 26th November 1930 and the evidence recorded thereat was accepted by me; I held an enquiry at Rourkela on the 5th March 1931.

Description of Accident.

3. On the 22nd November 1930 about 21-30 hours the General Manager and Manager of the Bisra Lime Company were proceeding to Rourkela on a light trolly; at mile 258/15-16 beyond the station yard the trolly was run into by a light engine and smashed to pieces.

The General Manager, Mr. Duff, was seriously injured and expired shortly after—no other persons were hurt.

Description of the locality of the accident.

4. The track from Rourkela station to Mile 258/15 is open and level, thence it rises at 1 in 500 to Mile 258/22-23 and continues level to Mile 259/3-4.

From Rourkela to Mile 258/14-15 it is on an embankment 2 to 18 feet high thence in cutting up to 11 feet deep.

The Main Line and Birmitrapur Branch run parallel and alongside one another up to Mile 259/14; the view towards the station is open and clear.

At the site of the accident the track is 3·5 feet higher than in the station yard.

The weather was fine and dark.

History of Trolly.

5. In January 1920 permission was accorded the Bisra Lime Company to use a light trolly between Manipahar and Panposh to convey officials of the Company to and from the latter station; the terms and conditions attached to this sanction cannot be traced. In May 1923 this permit was cancelled and the Company was told that a new permit could be granted on the following conditions:—

(*a*) Trolly to run to Koel Bank Block Hut (Mile 259/13), presumably from Birmitrapur, until line is opened for passenger traffic.

(*b*) Trolly to be run under trolly rules in force on the Bengal Nagpur Railway.

(*c*) Trolly design to be approved of by District Engineer, Chakradharpur.

(*d*) Head trollyman to be appointed by the Bengal Nagpur Railway and to be in charge of the trolly.

These conditions were never ratified and by oversight no formal trolly permit was issued. The Company however continued to use the trolly.

6. The trolly rules of the Bengal Nagpur Railway prescribe the following:—

(*a*) A certificate that the employee is acquainted with the trolly rules of the Railway and has received a copy thereof.

(*b*) A certificate by a District Engineer that the employee is conversant with the rules and is competent to be in charge of a trolly.

7. For trollies on Mill and Colliery Sidings it is further laid down—

(*i*) That the trolly must be of standard design.

(*ii*) That it is to be used only between certain specified places.

(*iii*) That it must only be used when in charge of the railway servant specially appointed.

(*iv*) That it must not be run until the authorised railway servant is provided with a permit.

(*v*) That every quarter the Mill or Colliery Manager will submit a certificate in a prescribed form to the Agent signed by the railway servant in charge that he is aware of the rules.

(*vi*) That any infringement of the rules will involve the cancellation of the trolly permit.

8. From February 1924 to January 1930 certificates were signed by Gomia for Trolly No. 31 in possession of the Bisra Lime Company, that it was of standard design and that the Head Trollyman was acquainted with the rules.

9. About three years ago the frame of the trolly was renewed.

10. The trolly and H. T. Gomia were under the direct orders of the Manager, Bisra Lime Company, and it was used by officials and contractors of the Company and State Officials and specific sanction was always obtained from the Manager before it was used by any one.

11. Tests made from the trolly showed that, owing to the numerous signal lights in the yard, a single red light on the engine could easily be confounded with the others even though visible from a distance.

History of the Engine.

12. Engine No. 474 H. M. was made over to Driver Abdulla Khan at Chakradharpur shed on the 18th November 1930 fully equipped and in good working order.

On the 22nd November 1930 the engine had only two lights, for working light it should have had three, and the vacuum brake was out of order; the shed repair books at Rourkela were examined by me and no entries found regarding the items cited above; there is no other record to show the driver had reported the defects.

13. It subsequently transpired that one missing light was found on another engine, the driver of the latter having removed it from No. 474 H. M. to replace one of his that had dropped off in service, this was picked up on the track.

14. Tests were made with this engine by me on the level to see in what distance it could be pulled up, by using the steam brake only, at varying speeds; at 15 miles per hour the distance was 260 feet.

15. Tests were made with this engine running tender foremost as to the view obtainable of a trolly light; it was found that with the driver leaning outside the cab in the normal way, a clear view of the light could be had from some 1,600 feet; at a distance of 300 feet the light was blotted out by the tender, as the former was on the side remote from the driver.

Conclusions.

16. The trolly must have been doing about 10 miles per hour on the down grade of 1 in 500 when the accident occurred.

The brakes were said to be in good order and there was a full complement of trollymen.

17. I consider that the evidence and facts narrated above clearly show that no vigilance or look-out was shown by either the occupants of the trolly or the engine crew.

18. H. T. Gomia states he first saw the engine looming up in the darkness some 150 feet away; it is probable he confused the engine and signal lights and failed to pick out the former; had the engine a white light as prescribed by the rules he would not have been misled.

19. The occupants of the trolly are emphatic about the mast light being alight and as it is scarcely credible that the trolly would run without a light I think it must be conceded that it was burning. There is no doubt of it being on the trolly as the red pieces of the lens were found among the wreckage by Inspector Braganza. The total disappearance of the lamp itself is a mystery, Inspector Braganza states he made a careful search but failed to recover it; all other parts of the trolly even the brass bearings, the oil can, the lock and chain were found so that robbery can be put aside.

20. The only other point for consideration is whether there was any motive behind its disappearance. Its absence would absolve the engine crew from blame, and I consider that while the persons on the trolly were busy in attending to Mr. Duff some member of the engine crew deliberately removed it. The tell-tale pieces of the lens were not removed as they could not be found without a light, and had perforce to be left behind. The engine was at the site for some four hours and there was ample time to grope in the dark and find such a bulky object as the lamp.

21. H. T. Gomia's duty was clear, *i.e.*, to ascertain the whereabouts of trains and to keep a good look-out. I consider that he failed in both and must be held primarily to blame for the accident.

His position is rather a delicate one, as a railway servant he should have complied with rules but if he had refused to obey the orders of the Manager, under whom he works, there would have been trouble.

22. There is nothing in the rules which requires outsiders using a trolly to keep a look-out; railway officials normally are on the *qui vive* when riding on trollies as they know the grave risks they run, one cannot expect others do likewise as they do not realise the risks involved. In the circumstances I do not consider any blame can attach to the Company's officials on the trolly; ordinary canons of prudence should, however, have induced them to keep a look-out.

23. The evidence of Driver Abdulla Khan is, I consider, a fabrication from beginning to end. He has made false statements about the engine lamp and vacuum brake; and though he admits to a speed of only 15 miles an hour the tests made clearly show he must have been running at not less than 30 miles an hour, as he ran for some 630 feet before stopping after running down the trolly. The tests as to range of view of a trolly light show he was not keeping a look-out, as he could easily have pulled up in ample time after first seeing the red light. I consider he is as much to blame for the accident as H. T. Gomia.

I think he can be given the benefit of the doubt regarding one lamp being alight, but he is entirely responsible for the absence of a white light as required by S. R. 143 (*a*) for light engines.

Recommendations.

24. The issue of permits, for trollies, to outsiders must be more strictly scrutinised than at present; they should only be issued in such cases where their use would be an advantage to the railway.

25. Permits must be available for specific persons only; indiscriminate use must be sternly put down and involve cancellation of the permit.

26. The engineering staff should be empowered to inspect trollies and see that rules are being complied with.

27. Some system must be devised whereby a proper check is regularly imposed on the use of trollies by outsiders.

28. The position of the railway servant in charge must be so defined that outside users of trollies cannot overrule him.

BENGAL NAGPUR RAILWAY.

DERAILMENT OF 205 DOWN GOODS TRAIN AT JALESWAR ON THE 22ND DECEMBER 1930.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1302/XIII/30, DATED THE 5TH JUNE 1931. (3894-T.).

In accordance with Rule 7 of the Railway Board's Notification No. 1926-T., dated the 19th March 1930, I beg to submit my report on the derailment of a wagon on 205 Down Goods on 22nd December 1930 at Basta on the Khargpur-Waltair Section of the Bengal Nagpur Railway.

2. An Officers' enquiry was held on the 31st December 1930 and the evidence recorded thereat was accepted by me. I held an enquiry at Khurda Road on 9th March 1931.

Description of the Accident.

3. On the 22nd December 1930 about 23-40 hours while No. 205 Down Goods was running through Basta, wagon No. 40315, East Indian Railway, was derailed on the points at the down end and dragged for 12 miles through Amarda Road; at Jaleswar the train hose pipe was severed and the train brought to rest on the loop with the rear portion fouling the main line.

Very extensive damage (about Rs. 1 to $1\frac{1}{2}$ lakhs worth) occurred to the track from Basta to Jaleswar causing a serious dislocation of traffic, Passenger trains were got through at restricted speed of 5 miles per hour but Goods traffic had to be suspended for 48 hours.

Description of the locality of the Accident.

4. Basta is an interlocked station with a loop and dead end taking off it; all on the straight and level; the station building is on the loop on the right side for down trains.

Amarda Road is an interlocked station with a loop and dead end taking off it; the station building is on the right for down trains.

Jaleswar is an interlocked station with a loop and a short through siding off it with dead ends at either end; the station building is on the left for down trains.

5. The track from Basta to Jaleswar is straight except for two right and one left handed 1° curves; grades vary from level to 1 in 250; there are three major bridges one of 9-60′; one over the Subanarika River of 11-150′ and 2-60′ G and one of 6-20′ G; also several minor bridges.

The track is laid throughout with 85 lb. F. F. rails on Cast Iron Pot sleepers at N + 3 per rail; it is fully ballasted.

6. The weather was fine and dark; the vacuum brake on the train was in good order; the track at the down end points at Basta was in good order as far as gauge, alignment and levels were concerned.

History of marks on track.

7. The first set of marks were slight indentations on the wooden sleepers in the lead of the up end points and crossings beginning at 47′—6″ and ending at 148′ from the nose of the switches; $3\frac{3}{4}$″ to $5\frac{1}{2}$″ from the inner edge of the flange of the left rail.

Nothing was found on the Cast Iron Pot sleepers between the up and down end points and crossings.

8. The flared end of the left check rail at the down end crossing had a dent on it; between the crossing and the switches there were indentations on four sleepers some $5\frac{1}{4}$″ inside the inner edge of the flange of the left rail.

From opposite the joint of the stock rail there was a continuous scored mark along the top table of the left tongue rail and the lead rail attached to it.

9. The slide chairs on the fourth and fifth sleepers of the right tongue rail had slight indentations and the sixth a deep one; all inside the track. There were no corresponding marks on the outside of the left tongue rail. Some of the interlocking gear attached to the right tongue rail was broken.

The gauge tie plate at the nose of the switch and the next two sleepers had no marks whatever; the next seven sleepers had corresponding marks inside and outside the rails of one wheel flange only; from the tenth sleeper there were marks of two wheel flanges inside and outside the rails respectively where the second pair of wheels came off. Beyond this these marks continue with variations right up to Jaleswar.

History of wagon.

10. Wagon No. 40315 E. I. R. was attached at Cuttack on 22nd December 1930 after having lain in a siding for 18 days; no examination of it was made prior to being put into service. It was received at Waltair from the Madras and Southern Maharatta Railway on the 29th November 1930.

The left leading safety hanger of the brake beam was found with the open hooked end straightened out; the brake beam hanger had come adrift from its pin connection to the underframe and was slightly damaged; the forked arm of the brake beam was broken and the straight arm bent.

The safety hangers on this wagon were forged from 1″ round bar flattened at the ends to $1\frac{3}{4}'' \times 5/16''$; the standard type is a flat $1\frac{3}{4}'' \times \frac{1}{2}''$; how this type came to be in use is being looked into by the East Indian Railway.

The centre of the brake beam is normally 20″ and the inside of the safety hanger 19″ above rail level; the brake beam hanger is $21\frac{1}{2}''$ long and would project 2″ below rail level when dangling.

Conclusions.

11. The actual cause of the derailment cannot be definitely ascertained; but from the facts and markings cited above it is possible to frame a logical sequence of events.

From the marks cited in paragraph 10 the brake beam hanger must have come adrift at the up end points. It was dangling, and struck the check rail at the down end crossing. The constant blows transmitted to the brake beam and the weight thereof began to tell on the safety hanger, causing the open hooked end to straighten out and the brake beam to drop after passing the down end crossing. Just before reaching the heel block, where the space between the crossing lead and left main line rails begins to close in, the fallen brake block was forced on to the top of the rail and the wheel mounted it.

At the fourth sleeper under the switches the mounted left wheel must have shifted laterally and caused the right wheel to drop on the slide chairs; the left wheel remained on the brake block and ultimately came off at the third sleeper beyond the nose of the switch.

12. I consider that the evidence of Guard Singh and Driver Venkataswamy as to exchange of signals at Basta and Amarda Road must be considered false; as the wagon had its wheels on the left outside the track and as sparks were being emitted they could scarcely have failed to see them. Guard Singh admitted at the preliminary enquiry that he did not exchange signals but withdrew the admission at the formal enquiry.

13. Driver Venkataswamy states he noticed no drag of the derailed wagon and is very emphatic about keeping his regulator in one position. This is scarcely credible and his evidence must be rejected.

14. From the records the " Train Entering Section " was given from Basta at 23-39 hours and the train came to a stand at Jaleswar at 0-10 hours, *i.e.*, it covered 12 miles in 31 minutes, and must have been running about 22 miles per hour.

15. Assistant Station Master Mohapatra (Amarda Road) gave the " Train out of Section " to Basta at 23-48 hours. He got " Authority to Proceed " from Jaleswar at 23-45 hours and gave the " Train Entering Section " to Jaleswar at 23-48 hours; he reported at 23-52 hours to the Controller that there was a hot axle on the train.

He must have been engaged at the instruments for about ten minutes and during this time he evidently did not leave the office. He states he saw sparks from all four wheels yet he reported a hot box. It is evident he was given some information by one of his staff and actually saw nothing himself.

16. It seems incredible that, had he heard and seen the derailed vehicle passing the station, he had not sense enough to realise something was radically wrong. Not having seen anything, the fact that the track was damaged was not appreciated by him and he allowed a light engine and 7 Down Passenger Train over the section without taking any steps to examine the track.

17. Apart from the actual damage to the track, Rs. 1 to 1½ (approx.) lakhs, was the serious dislocation of traffic entailing—

(*a*) Goods traffic being suspended for 48 hours.

(*b*) South-bound traffic being held up at Adra and Shalimar for 48 hours.

(*c*) Four goods trains being stabled on the section for 48 hours.

(*d*) Detention to Passenger and Goods Trains 143 working hours.

18. The derailed wagon ran over several open deck bridges without mishap as it was more or less undamaged; had it been otherwise the results would have been disastrous.

19. The precise circumstances attending the derailment cannot be stated but there is sufficient circumstantial evidence to show that an equal share of responsibility must be borne by—

(*a*) Guard Singh,

(*b*) Driver Venkataswamy,

(*c*) Assistant Station Master Mohapatra,

(*d*) Assistant Train Examiner Chinniah,

the first three for negligence in connection with a running train and the last named for passing the wagon when it was defective.

Recommendations.

20. The examination of trains by Train Examining Staff should be looked into to ensure thorough inspection at selected places.

21. The question of exchange of signals between guards and drivers on goods trains requires investigation to ensure that both the train and station staff have facilities for taking action in an emergency.

22. The question of exchange of signals on all goods trains warrants consideration as very serious results accrue through damages *en route* not being detected in time.

EAST INDIAN RAILWAY.

DERAILMENT OF No. 73 DOWN DEHRA DUN-LAHORE PASSENGER TRAIN AT HARRAWALA STATION ON THE 20TH JANUARY 1931.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 635-T., DATED THE 28TH JANUARY 1931. (3757-T.)

In accordance with Rule 8 of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I beg to submit a report on the enquiry I held into the circumstances attending the derailment of No. 73 Down Dehra Dun-Lahore Passenger train at Harrawala station, mile 44 on the Lhaksar-Dehra Dun Branch of the East Indian Railway on the 20th January 1931.

2. The enquiry was held on 23rd January 1931, at Harrawala station at which the following officers were present:—

Mr. E. R. Speechly, Senior Superintendent of Works, East Indian Railway, Moradabad.

Mr. C. Pearce, Superintendent of Power, East Indian Railway, Moradabad.

Mr. E. M. Harris, Inspector, Government Railway Police.

Description of Accident.

3. At about 16 hours on 20th January 1931, No. 73 Down which left Dehra Dun at 15-45, ran through Harrawala station out of control, ran through the slip siding at the south end of the yard and the engine and two leading bogies were derailed, the engine being over-turned and both bogies partially telescoped.

The guard of the train and one passenger were slightly injured. The injured passenger was said to be without a ticket and disappeared after the accident.

Description of the Locality of Accident.

4. After running through the slip siding the engine turned over on its left side into a shallow borrowpit about 5 feet below the level of the siding.

5. Harrawala station is on a falling grade of 1 in 500 from Dehra Dun. For about two miles on the Dehra Dun side there is a falling grade towards Harrawala, about one mile of which is 1 in 75 including the last quarter mile approaching the station.

Conclusions.

6. The accident was due to the carelessness and misjudgment of the driver, Badruddin, who failed to apply his brakes soon enough to pull up the train on the steep grade approaching Harrawala station.

7. The evidence shows that the vacuum brakes were in good order before leaving Dehra Dun and after the accident the six undamaged vehicles were found by the Head Train Examiner to have their brakes hard on.

8. The load was a normal one consisting of 8 bogie vehicles with an HPC class engine and with the brakes in good order should have been easily controlled.

9. The driver was new to the road and evidently did not realise that special care is necessary on steep grades. Neither he nor the guard knew the permanent speed restrictions on the section though it is clearly laid down in the Working Time Table that speed for descending trains shall not exceed 30 miles per hour. On his own statement the driver was going at 40 miles per hour before approaching the station.

10. There are no curves for about $1\frac{1}{2}$ miles from the station and the signals are clearly visible for an adequate distance.

11. The amended working rules for Harrawala station say that the slip siding points may be set for the main line if line clear has been received from Doiwala for a Down train. It is not made obligatory and to do so and in practice the points are kept set for the siding until the train has arrived at Harrawala, except in the case of non-stopping trains. The rules should be more definite.

12. The question naturally arises as to whether catch sidings should be provided at Harrawala and similar stations on the Dehra Dun Branch. I do not consider this necessary but the slip siding should be extended to a length of 600 feet to give an adequate distance beyond the trailing points. The siding should be on a rising grade and the last 100 feet sanded.

BENGAL AND NORTH-WESTERN RAILWAY.

DERAILMENT OF No. 3 UP PASSENGER TRAIN BETWEEN MAIJAPUR AND COLONELGANJ ON THE 26TH JANUARY 1931.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 170-T., DATED THE 20TH JUNE 1931. (3763-T.)

As my telegram No. 630-T., dated the 26th January 1931, was not received by the Agent, Bengal and North-Western Railway, in time for the necessary witnesses to be collected by January 27th, I was unable to hold a formal enquiry on that date. I, however, inspected the site of the accident with the Resident Engineer and satisfied myself that the accident was due to deliberate train wrecking, two pairs of fish plates having been removed and the track slewed.

On January 31st a Departmental Senior Officers' Joint Enquiry was held which I attended and I agree with the Finding. The Police are still investigating the case but so far have not discovered the persons responsible for the derailment.

I send herewith a copy of the Proceedings of the Enquiry.

Committee.

E. H. Kellie, Traffic Superintendent, *President.*

W. T. S. Cairns, District Loco. Superintendent, *Member.*

H. J. Smyth, Resident Engineer, *Member.*

E. R. Casement, Senior Government Inspector, *Member.*

E. Densham Smith, Government Railway Police, *Member.*

History.

On 26th January 1931 at about 2-45 hours No. 3 Up passenger train was derailed at mile No. 422/18 between Maijapur and Colonelganj.

The accident occurred on a straight and level portion of the track and the bank was about four feet high.

Engine No. 366 was derailed with all wheels.

Bogie Brake and III No. 1890 was derailed and capsized.

Bogie III No. 1472 was derailed and capsized.

Bogie III No. 1198 was derailed and partially capsized.

Bogie Compo. I and II No. 242 was derailed with all wheels and canted over.

Bogie Compo. Inter and III No. 459 was derailed with all wheels.

Bogie III No. 1277 was derailed with leading bogie wheels only.

Two bogie thirds, six wheeled rear Brake-van, 6 wheeled postal-van, 6 wheeled Compo. I and II (Nanpara through carriage) and Family carriage No. 20 in rear were not derailed.

The permanent way was up-rooted and the line blocked.

Thirteen passengers received minor injuries and were attended to by Dr. D'Souza, Assistant Medical Officer, Gonda.

1st Break Down train arrived at site of accident at 7-15 hours from Gonda and 2nd Break Down train with steam crane arrived at site of accident at 12-40 hours from Gorakhpur.

Transhipment of passengers was carried out with as little delay and inconvenience as possible.

The last train to pass over the site of derailment prior to 3 Up was No. 144 Down which left Colonelganj at 1-22 hours and arrived Maijapur at 1-37 hours on 26th January 1931.

Through running was restored at 20-30 hours on 26th January 1931.

Finding.

After considering the evidence we are of the opinion that the accident was due to some person or persons tampering with the line and removing two pairs of fish plates from opposite joints and slewing the track.

(Sd.) E. H. KELLIE, D.T.S.,
President.
31st January 1931.

(Sd.) W. T. S. CAIRNS,
Member.
31st January 1931.

(Sd.) H. J. SMYTH,
Member.
31st January 1931.

Remarks by the Agent, Bengal and North Western Railway.

I agree with the Finding.

Rider.

The driver is to be commended for being on the alert and applying his brakes promptly and bringing his engine to a stand-still 106 yards from the initial point of derailment and thus preventing the whole train being derailed.

(Sd.) E. H. KELLIE, D.T.S.,
President.

(Sd.) W. T. S. CAIRNS,
Member.
31st January 1931.

(Sd.) H. J. SMYTH,
Member.

BENGAL AND NORTH-WESTERN RAILWAY.

ACCIDENT TO A STONE TRAIN IN DARA NALA SIDING AT JARWA STATION ON THE 26TH FEBRUARY 1931.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 745-T., DATED THE 11TH MARCH 1931. (3817-T.)

In accordance with Rule 8 of Railway Department Notification No. 1926-T., dated the 19th March 1930, I now submit a report of an enquiry held at Jarwa station, Bengal and North-Western Railway, on the 2nd March 1931, into the particulars of accident to stone train in Dara Nala Siding at Jarwa which occurred on the 26th February 1931.

2. Departmental officers and the Superintendent, Railway Police, attended the enquiry.

Description of the Accident.

3. On the morning of 26th February 1931, a loaded rake of 25 wagons with 1 crew-van and 1 brake-van was being pulled out of the ballast siding towards Jarwa station. Near the top of the grade approaching the station the engine failed and the driver started to back the train in order to get a run at the slope.

While it was being backed the rear of the train collided with a rake of loaded wagons which had been left near the north end of the siding and had run away down the slope of the nala.

A number of contractor's coolies were travelling in the loaded wagons and 10 of these coolies were killed and seven injured in the collision, 19 wagons were damaged to the extent of some Rs. 15,000.

Description of the locality of the accident.

4. The ballast siding on leaving Jarwa station falls at a grade of 1 in 140 for about 3,000 feet to the bottom of the Dara Nala. It continues up the bed of the nala for about 2 miles on rising grades the steepest of which is 1 in 60. The collision occurred on the slope between the nala bed and Jarwa station.

At the site of accident the line is on a sharp curve with jungle on both sides of the track.

Conclusions.

5. I consider the Guard, Jamil Ahmed, primarily responsible for the accident in that—

(1) He did not take the action required in General Rule 156 (3) and (12) to secure the vehicles cut off in the siding.

(2) Before allowing the train to be pushed back he took no steps to see that the line behind the train was clear of obstruction.

(3) He took no precautions to prevent contractor's coolies from travelling in the loaded wagons.

6. I consider the Station Master, Jarwa, Kashi Ram, partially responsible in that he had no knowledge of the rules for working the siding and took no action whatever to see that the rules were carried out, although the rules were hung up in a prominent place in his office. This Station Master gave his age as 54 but I am convinced that he is long past the age limit and is quite incapable of carrying on his work as a Station Master.

7. The arrangements for working this ballast train are most unsatisfactory both from the traffic and engineering points of view. Although the train was required to work on heavy grades and wagons had to be cut off

at different points in the siding, the only steps taken to insure safe working were verbal orders given by the Assistant Engineer to the Sub-Permanent-Way Inspector, Overseer and Time Keeper, all of whom had other work to do. The guard was not provided with chains, padlocks or sprags to enable him to carry out the general rules for working ballast trains.

8. The rules for working the siding were apparently originally framed for some other siding. The siding referred to in paragraph 3 of the rules does not exist and is not required as there is no danger of wagons running back up the grade from the siding into the station. For the safety of the station it is only necessary to ensure that ballast trains returning from the siding stop before entering the station limits and are admitted on hand signals.

9. The rule limiting loads to 20 and 10 for empty and loaded wagons respectively was framed for lighter engines than the Y. F. type used and although the load of 25 loaded and 2 empty which it failed to pull out of the siding was evidently too great it could probably deal with 18 or 20 loaded wagons safely. Tests should be made by a Loco. Officer or Inspector and the Assistant Engineer to fix the maximum load for each type of engine in use on these ballast trains.

10. The composition of the train should have had more consideration. The practice has been to push 50 empty wagons into the siding with one brake-van next the engine and another at the other end of the train. The train is pulled out in two parts so that the only brake-van with the first half of the train is next the engine. One brake-van should be in the middle of the train when being pushed out so that it will be in rear of the returning load.

11. The wedges used for holding wagons are too light and sprags should be used.

12. The end wagons of each rake cut off for loading should be chained and padlocked.

13. A brakesman should be permanently on duty in the siding to see that all wagons are properly secured and that no hand shunting is attempted.

EAST INDIAN RAILWAY.

DERAILMENT OF AN UP GOMOH SPECIAL GOODS TRAIN ON THE 27TH MARCH 1931 AT PRADHANKHANTA STATION.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1902/XIII/31, DATED THE 8TH SEPTEMBER 1931. (3841-T.)

I have the honour to report for the information of the Railway Board, in accordance with Rule 7 of Notification No. 1926-T., dated the 19th March 1930, the result of my enquiry into the derailment of Up Gomoh Special Goods which occurred about 0-50 hours on 27th March 1931 at Pradhankhanta Station on the Grand Chord of the East Indian Railway.

2. Officers enquiries were held on 31st March and 10th April 1931 and the evidence recorded thereat accepted by me; I held an enquiry at Pradhankhanta on 9th June 1931.

Description of the Accident.

3. On 27th March 1931 about 0-50 hours Up Gomoh Special Goods was received on the Up loop with the idea of side-tracking it to give precedence to the Imperial Mail. The driver, instead of stopping, attempted to run through and ran into the snag dead end; the engine and seven wagons capsized, fouling both the up and down main lines for several hours.

The driver and one fireman were seriously injured, the second fireman and guard slightly; there were no other casualties.

4. The train consisted of 56 vehicles drawn by one H. G. S. engine, the total weight being about 1,730 tons; 52 vehicles were vacuum braked and 4 piped, all in good order.

The weather was fine and clear but dark.

The Relief Train from Dhanbad was turned out in good time.

Description of the Locality of the Accident.

5. Pradhankhanta is a fully interlocked four-line station on the double line, connected at each end with the branch to Pathardihi.

Approaching from Howrah there is a steep up grade of 1 in 225 to the Up Home Signal, thence level to the West Cabin and an Up grade of 1 in 250 beyond.

6. Electric Block Instruments are installed for working trains on the Main Line and Neales Token Instruments for the branch to Pathardihi; the station is worked under "A" Class Rules for Down Trains and "B" Class Rules for Up and Branch trains.

7. Three cabins are provided, one at each end and one on the branch where it bifurcates.

The snag at the up end of the loop is turned away slightly from the main line and terminates against the face of a cutting some 20 feet deep. The rails were covered with sand to a depth of 12 ins. for some 30 feet and there was 60 feet of sand beyond.

Conclusions.

8. Driver Sowkie and both his firemen emphatically state the Up Loop Starter was lowered and that the former was justified in running through. No other witnesses bear them out and there is not the slightest doubt all have deliberately perjured themselves to justify the driver's action.

9. The interlocking was inspected and tested shortly after the accident and found in thorough order; I tested it on 9th June 1931 and it was all right; I was informed nothing had been done to it.

The interlocking provides—

(*a*) That before the Up Loop Home can be lowered by East Cabin, West Cabin has to release Slot 3 W; this requires Lever 15 which sets the points for the Snag Dead End and is backlocked. This setting is necessary to provide the adequate distance or overshoot for a train entering the loop.

(*b*) While Lever 15 is held for the snag the Up Loop Starter No. 6 W cannot be pulled off; had the latter been off, the route from the loop to the main would have been set and the train would not have entered the snag. This clearly proves the Up Loop Starter was against the driver and he is therefore solely responsible for the accident through negligent driving.

10. Driver Sowkie and Guard Pereira both state they have frequently run through the loop and the former alleges that it is a common practice not to get a starting order, which the rules prescribe; the Station staff deny this and state the starting order has always been used. The old form (T. 721) then in use had no counterfoil and there is no record to prove or disprove the statements made for this particular train; the new form (T. 721) has one which the driver has to sign. The forms are not machine numbered. If this were done the number could be quoted in the train registers. It came to light also that when the driver delivers up these forms along with his other papers at the shed, at the end of a run, the forms are not sent to the Transportation Branch. Nine blocks of 100 forms each were delivered to the station in September 1930 and two of them had been used. One can conclude therefore they were being used for some trains.

11. Driver Sowkie states he did not exchange signals with the guard as the rules do not require it. This is wrong, as S. R. 124 (*c*) (*iii*) explicitly states signals must be exchanged on Goods Trains; Guard Pereira was aware of the rule and states he would have complied with it near the advanced starter, as the range of view up to it is obscured by wagons in the stabling sidings, the cutting and the line being on a curve; the matter should be looked into to see if an improvement can be effected.

12. Driver Sowkie alleges he shut off steam at the East Cabin. This appears to be untrue, as he was then on an up grade of 1 in 225 and, with the engine rolling, he would scarcely be able to surmount the grade. It is obviously a fabrication to justify his statement that he was only doing 10 miles per hour when the derailment occurred. The violence of the impact with the face of the cutting and the capsizing and hurling of loaded vehicles on to the down track some thirty feet away is conclusive evidence that the speed of the train was about 20 miles per hour.

13. What apparently happened is that Driver Sowkie was running at some 20 miles per hour to surmount the up grade and, relying on the fact that he had on previous occasions run through the loop without a starting order, he took it for granted everything was in his favour and pushed on without giving a thought to signals. It is very unfortunate that no one ascertained the position of the engine regulator and vaccuum brake handle after the accident. I am almost sure they must have been in the running position and that the driver's statement that he noticed that he was running into the snag in the darkness is untrue; he had no searchlight and as the snag begins some 100 feet away from the points he could scarcely have seen anything in the dark.

14. Guard Pereira states the train entered the loop at 30 miles per hour and though he was aware of the fact that the speed should not have exceeded 10 miles per hour he failed to take action under G. R. 126 and paragraph 12 (*a*) of the Rules for the Working of the Automatic Vacuum Brake.

MGIPC—L—X-3—27-7-32—575.

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1. NORTH-WESTERN RAILWAY.

DERAILMENT OF No. 83 UP PASSENGER TRAIN AT MILE 135/7, BETWEEN LALRU AND GHAGGAR, ON THE 6TH APRIL 1931.

FROM MR. J. SCRUBY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. T/27, DATED THE 15TH APRIL 1931. (3851-T.).

In accordance with Rule (8) of Railway Board's Notification No. 1926-T, dated 19th March 1930, I submit my report of an enquiry into the circumstances attending the derailment of No. 83 Up Passenger Train at mile 135/7, on the 6th of April 1931, between Lalru and Ghaggar on the Ambala to Kalka section of the North Western Railway.

2. I held the enquiry at Lalru on the 9th of April 1931 at which the following officers were present :—

Mr. F. R. Hawkes, Divisional Superintendent, Delhi.

Sardar Bahadur Ram Singh, Divisional Engineer, Delhi.

Mr. H. M. R. Morse, Divisional Rolling Stock Officer, Delhi.

Rai Sahib T. K. Sen Gupta, Assistant Signal Engineer, Delhi.

Mr. J. E. Ryall, Assistant Inspector General, Railway Police.

Mr. H. B. Powis, Sub-Divisional Officer, Railway Police.

The site of the accident was visited by me in company with other officers attending the enquiry, on the 8th April 1931.

Description of the accident.

3. At 3-25 hours on the 6th of April 1931, No. 83 Up Passenger Train was derailed at mile 135/7, between Lalru and Ghaggar.

4. The train consisted of one SG. C Class engine, eleven bogie coaching vehicles and two four wheel coaching vehicles, vacuum braked throughout.

5. At the point of derailment one rail was disconnected from the inside of the curve and placed about eighteen inches towards the centre line of the track and concentric with the curve.

6. The engine of 83 Up Train on arriving at the gap in the track caused by the rail which was removed, derailed. The train was brought to rest by application of the vacuum brake and from the resistance of sleepers and ballast in a distance of 329 feet in the following condition :—The engine capsized and lying on its side on the inside of the curve. The next four bogie vehicles containing passengers derailed and canting over on the inside of the curve ; the trailing wheels of the fourth vehicle remained on the rails. The rest of the train comprising seven bogie and two four wheel vehicles in-tact on the rails.

7. Of the passengers travelling in the train only one was hurt, a lady travelling in a 2nd class compartment of the last vehicle on the train, received a cut on the head and suffered from shock. The driver of the engine and the two firemen suffered from shock, while the first fireman also received an abrasion on the leg.

8. The injured passenger was given first aid by other passengers in the train, one of whom was a nursing sister. Assistance was given her to the transhipment train by railway staff and she continued her journey to Simla where arrangements for her reception were made. The engine crew were attended to by the railway medical staff and returned to Ambala by train, where they were admitted to hospital.

9. The engine and first four bogie coaches were damaged and the track was torn up for a length of 300 feet. Total damage to engine and rolling stock is estimated at Rs. 7,500 and to track at Rs. 4,500, approximately.

10. Relief train arrived at 5-55 hours. First transhipment of passengers was effected at 7-5 hours. A diversion around the obstruction was made and opened to traffic at 19 hours on the same day.

Description of locality of the accident and other factors.

11. The weather was fine and it was moon-light when the accident occurred at 3-25 hours.

12. The sanctioned maximum speed of the section is 40 miles per hour and the booked speed of the train is 30 miles per hour.

13. The station immediately preceding the site of accident is Lalru, about 1⅓ miles distant. According to the Train Register 83 Up passed Lalru station at 3-15 hours, running about ten minutes late.

14. The point of derailment was four fifths of the distance along a 2° curve of some 1,400 feet long on a gradient of 1 in 500 up in the direction the train was travelling. The line is on embankment four to five feet high with fencing on either side and clear view obtains.

15. The surrounding country is open and cultivated. The nearest village is Lalru about a quarter of a mile on the left hand side while the nearest gang hut is one and a half miles towards Ghaggar and the nearest gate lodge a quarter of a mile distant towards Lalru. The main road between Ambala and Kalka runs along the right hand side and within a hundred yards of the railway.

16. The track is 75 lbs. DH rails laid on Denham and Olphants plate sleepers well ballasted with stone.

17. After the accident at the point of derailment one rail from the inside of the curve was found disconnected and lying about eighteen inches inside the track. Most of the cotters and jaws for holding this rail were found inside the track. At the south joint one fish plate was under the end of the removed rail and the other a foot away. At the north joint one fish plate was lying two feet away and the other some thirty feet distant from the track near a bush. Seven fish bolts and five nuts were recovered from the ballast. The rail, fish plates, fish bolts and nuts, cotters and most of the jaws mentioned in the foregoing were in undamaged condition. Otherwise, rails were distorted and sleepers broken and bent for a length of 300 feet.

Conclusion.

18. From the evidence given as to the position of a rail at the point of derailment immediately after the accident and the undamaged condition of this rail, four fish plates, seven fish bolts and five nuts for fish bolts, all of which were collected from the place of derailment and kept under police guard, I am left in no doubt that the cause of the derailment was the removal of a rail from the inside of curve at mile 137/7 prior to the arrival of 83 Up Passenger Train.

19. I conclude the rail was removed between the hours of 0-35 and 3-25 on the 6th of April in a criminal and successful attempt at train wrecking. It is fortunate that injuries to persons and damage to property were comparatively light when in the circumstances they might have been so very serious.

20. The reason for the crime and the identification of the criminals are matters with which the Police are engaged.

21. I am satisfied that the electric head light on the engine was lit, the train was in good running order, and the track, other than by reason of the removed rail, was in good condition. I am of opinion the speed of the train immediately before the accident was about 30 miles per hour and therefore not exceeding the sanctioned maximum speed.

22. I do not consider under ordinary running conditions and the particular conditions which prevailed, the engine crew would notice the defect of the track in time to avert an accident. I therefore conclude the engine crew are in no way responsible for the accident.

23. From the evidence, the first examination of the control levers in the engine cab, and the distance and condition in which the train was brought to

rest, I am of opinion the engine driver closed the steam regulator and applied the vacuum brake immediately he experienced a jar at point of derailment.

24. I am satisfied the injured persons received proper medical attention and assistance.

25. The measures taken for transhipment of passengers and in resuming through railway communication were prompt and efficient.

2. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

DESTRUCTION BY FIRE OF A THIRD CLASS BOGIE COACH BETWEEN KATUDA AND RAJSEETAPUR ON THE DHRANGADRA BRANCH ON THE 7TH APRIL 1931.

FROM MR. H. LAWTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1172, DATED THE 28TH MAY 1931. (3891-T.).

1. The accident occurred whilst I was out on annual inspection. After receipt of the Railway joint enquiry I arranged to see a similar coach and make some enquiries the next time that I passed Wadhwan, which was on 14th May 1931. Particulars of the accident are :—

Brief description of the accident.

2. On 7th April 1931 at about 18 hours, 146 Down running from Wadhwan to Dhrangadra shortly after leaving Katuda flag station (the next station but one to Wadhwan) was found to have the rearmost bogie third No. 2822 on fire. This bogie had a women's compartment.

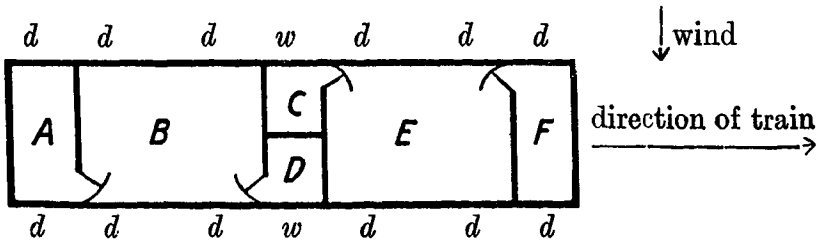
3. This train often runs mixed but on the day of the accident there were no goods vehicles on the train and continuous vacuum brake was in operation; it was used to stop the train being applied by the guard who heard the shouts of the passengers in the coach on fire.

4. On coming to a stand the guard detrained all the passengers from the coach and then isolated it.

5. The guard's van was not fitted with a fire-extinguisher, nor was there any water at site. There was a strong breeze blowing and the woodwork of the coach was completely burnt out in a very short time.

Brief description of the locality.

6. The coach had compartments thus :—



A contained one passenger.
B was empty.
C & D are latrines.
F & E were women's compartments.

7. The fire seems to have originated near latrine C for the guard stated that when he first went to the carriage he saw the outside on fire below the window of C over which he dashed a lota of water and he then saw the side of the coach on fire above the window of C. The latrines have asbestos sheet partitions on wooden framing and have no slit in the window sill as the window is fixed. Most of the roof of the latrine is occupied by water (flushing) tank. The electric wires of similar coach examined are encased in a wooden conduit.

I would add that I think one item of the guard's statement is open to misunderstanding. I asked him definitely if on his arrival at the burning carriage there was a hole through into the latrine in the side below the window of latrine C and he replied No. I think his memory is slightly confused and that if he saw into the latrine at all it was through the window.

Detailed statement of evidence taken.

8. The guard of the train on which the accident occurred was present when I visited Wadhwan and described the accident to me. I also saw the under-frame. I took no formal evidence as it was all taken and included in the Railway joint inquiry proceedings, also various information about the train and the coach that was burnt.

Conclusions arrived at.

9. I concur with the finding of the joint enquiry, with which the Agent also agrees. This finding reads that from the statements recorded, the original seat of the fire, though somewhere near the centre of the coach, cannot be exactly located.

The staff on the spot were too much concerned with removing passengers and their luggage to safety, and saving the rest of the train, to give much attention to the seat, or the cause, of the fire.

It is therefore not possible to arrive at any definite conclusion.

The possible causes of the fire that the committee have eliminated are :—

(1) Hot axle. All the journals and boxes are in good condition now.

(2) Electrical short circuit. The coach had no dynamo or batteries but was wired only. The lighting is controlled from either brake van. The current was not switched on. The evidence seems to show that the fire did not originate near the main wires which run along the centre of the roof.

(3) Sparks from engine. The load was very light. There was a side wind except for a few feet on the curve just outside Wadhwan. The carriage was too far in the rear for a live spark to reach it.

(4) We have read the statement of several passengers who were in the train and they throw no light on the matter.

Recommendations, etc.

10. I consider that though one or two fire extinguishers may not save a coach, they may be of great assistance in controlling a fire until passengers have been detrained, and possibly during the isolation of a burning coach. The matter is under discussion with the administration.

3. NORTH WESTERN RAILWAY.

No. 268 DN. TRAIN RUNNING INTO A MOTOR CAR AT LEVEL CROSSING, MILE 102/10, NEAR SARGODHA ON THE 13TH APRIL 1931.

FROM MR. J. SCRUBY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 28-T/31, DATED THE 30TH APRIL 1931. (3858-T).

In accordance with Rule (8) of Railway Board's Notification No. 1926-T, dated 19th March 1930, I submit herewith my report of an enquiry held by me, at Sargodha, on the 21st and 22nd of April 1931, to investigate the circumstances of collision between mixed train No. 268 Down and a taxi motor car No. P. 7712-A, at level crossing No. 8 mile 102/10, near Sargodha, on the branch line of the North Western Railway, on 13th April 1931.

2. I received intimation of the accident on 13th April 1931, while on an open line inspection tour of duty. A Divisional Officers' enquiry was held on 16th April 1931, the evidence recorded at which I have accepted and compiled with the further evidence recorded at my enquiry.

3. The following officers attended the enquiry on 21st April 1931 :—

Mr. S. G. H. Shah, Divisional Transportation Officer, Rawalpindi.

Mr. A. D. Arshad, Magistrate, 1st Class, Sargodha.

Mr. A. F. Perrott, Superintendent of Police, Sargodha.

Mr. W. A. Burn, Sub-Divisional Officer, N. W. Railway, Sargodha.

I inspected the site of accident on the 21st and 22nd April 1931.

Description of accident.

4. On the 13th April 1931, at 5-34 hours, engine of mixed train No. 268 Down, having started from Sargodha station on its journey to Chhini Khichi, collided with a taxi motor car, No. P. 7712-A, at level crossing No. 8, mile 102/10. The motor car was proceeding in a direction from Police Lines, within the Civil Station of Sargodha, towards the Jhelum River on the city side of the railway.

5. The following casualties among persons travelling in the motor car were caused as a result of the accident :—One female child was instantaneously killed. One youth was grievously injured necessitating the amputation of a leg. Nine other persons suffered minor injuries.

6. The motor car was completely smashed and came to rest with its front " bumper iron " interlocked with one leaf of the level crossing gate and its radiator pointing in a direction opposite to the movement of the train.

7. The train was brought to rest by application of vacuum brake, with engine at a distance of 217 feet from the level crossing.

8. The cow catcher, front and back left footsteps, left injector casting and pipe connections, of the engine were damaged, and one footboard of a coaching vehicle slightly damaged. The estimated total cost of these damages is Rs. 102.

9. The injured persons received medical attention from the Railway Sub-Assistant Surgeon who was travelling in the train. Those who required hospital treatment were taken to the Civil Hospital, which is within a hundred yards of the site of accident, and others proceeded to their homes where they were subsequently attended by the Sub-Assistant Surgeon. The dead body was taken away by relatives.

10. After disposal of the injured and removal of the obstruction the train returned to Sargodha station, to give way to an up train, and again started on its journey after a detention of about two hours.

11. The weather was fine but the accident took place during the hours of darkness.

Description of the locality of the accident and other factors.

12. This level crossing, provided with gates is situated within the up outer signal of Sargodha. It crosses two railway tracks, one of which is the branch line between Sargodha Junction and Hundewali Junction, the other is a siding to Sargodha Factories. The level crossing serves a busy metalled road connecting the civil station with the city of Sargodha along which an estimate of traffic is, 150 motor vehicles by day, 50 motor vehicles by night, together with a large number of other vehicles. The railway traffic over the level crossing is fairly heavy, there being ten passenger trains and in addition a number of goods trains.

13. The railway approach to level crossing from Sargodha station is straight and on a gradient of 1 in 2,000 down. The railway in the vicinity is on embankment of about three feet high. Visibility of the level crossing from the railway is good from Sargodha station onwards, but the road approaches are obscured to a great extent by buildings and trees.

14. The public road is straight and ramps up about four feet over the level crossing. On the road approach from the civil station, at a distance of about 500 feet away, the level crossing is visible and from this point a length of some 300 feet of railway from the level crossing towards Sargodha station comes to view. Proceeding along the road to a point 300 feet distant from the level crossing a length of 480 feet of railway is seen, and at 70 feet from the level crossing the railway station is in open view.

With head lights full on the level crossing should be seen by a driver of a motor car at a distance of 500 feet, while with head lights dimmed he would not be able to detect the condition of the gates until close up.

The approach road crosses the railway at almost a right angle.

15. The train engine was not fitted with an electric head light, but it carried three oil burning red head lights also the lights in the compartments of the coaching stock were lit. The engine head lights would not be easily visible from the approach road until close to the level crossing while the train lights should be apparent from a greater distance.

16. Classification of the level crossing is A. It does not however comply with certain important items of the specification for this class ; for example, the gates are not rod coupled nor are they interlocked with station signals. The surface of the level crossing is paved with wood sleepers which at the time of my inspection was rough. The gates, although they functioned as a barrier, were not rigid and would be improved by stiffening. Two gate stops did not effectively hook back the gates. One padlock was much worn, and out of several attempts to lock it with the key I was only once successful.

17. The level crossing is manned by two gatekeepers, each with twelve hours period of duty. A single unit gate lodge is provided at the site.

18. There are no conventional warning signs on the road nor are there whistle boards on the railway.

19. I am of opinion the speed of the train was not greater than 15 miles per hour. The train was vacuum braked throughout and brakes were in good working order.

20. The window on driver's side of the class S. T. engine, which hauled the train in question, gives a good look out to the left front of the direction travelling as well as full ahead.

21. The working rules for operating the gates of this level crossing relative to the despatch of a train are appended.

Conclusions.

22. Evidence regarding the state of the level crossing gates immediately prior to the accident is conflicting. I am unable to arrive at a conclusion on this point. There is, however, probability that the gates on one or both sides of the level crossing were not closed across the road by the gatekeeper.

23. The gatekeeper should have been aware of the time of departure of the train in question and on the alert to close and lock the level crossing gates. He states that the gates on the one side were closed and padlocked and on the side

from which the motor car approached were closed but not padlocked. His omission to lock these gates was a breach of General Rule 229(*c*) and a primary cause of the accident. Even if one or both the level crossing gates were open, I am unable to believe the accident would have occurred had the driver of the motor car observed reasonable prudence in approaching the level crossing. It is observed the motor car driver was well acquainted for several years with the road. I am therefore of opinion that contributory negligence rests with the driver of the motor car.

24. The evidence of occupants of the motor car states that the motor car head lights were full on. I am however of opinion in view of the light switch being found indicating " park " after the accident and by reason of the circumstances of collision the motor car head lights were dim while approaching the level crossing.

Recommendations and Observations.

25. I recommend the gatekeeper on duty at the time of accident be dealt with by the Railway Administration.

26. In view of the fast and heavy road traffic the gates of level crossings Nos. 8 and 9 should be rod coupled at once, and interlocking with station signals is recommended. Until such time as the latter is done, whistle boards are desirable together with rules, and strict observance of the same, whereby the despatch and reception of trains is not permitted until the gatemen at these level crossings have signalled that the gates are closed and locked across the public road. This should be timed so as to cause as little delay as possible to road traffic.

27. Working rules regarding the operation of gates on level crossings Nos. 8 and 9 prescribe that the pointsman will satisfy himself the level crossing gates are closed and locked against road traffic before, in the one case, he lowers the outer signal for the reception of a train, or in the other case, exchanges signals with the station master on duty for the despatch of a train. The rules need amplifying to show by what means the pointsman shall satisfy himself in this matter. It is obviously impracticable for him to personally examine the condition of the gates at these two level crossings.

According to the evidence a system of signalling between the pointsman and gatekeepers is adopted to comply with these working rules, although I am unable to obtain authoritative written orders embodying this system.

In the above circumstances, and in view of the evidence, I can not assign responsibility for this accident to the pointsman.

28. The provision of electric search lights on engines, is undoubtedly a safeguard against accidents at nights, on level crossings and elsewhere. I recommend the fitting of these on all engines, employed in night running, as early as practicable.

29. I am not satisfied with the statement, or the necessity, of all the engine crew being engaged at the same time on duties other than on the look out prior to the accident.

30. The taxi motor car was licensed to carry six persons but was loaded with a total of twelve adults and children, all of whom except the driver, I am informed, were connected with the Police. The senior male passenger was a Head Constable. It is also observed that the " Road Certificate ", " Special certificate to drive a motor car on hire " and " Driving License " according to the dates shown thereon were all time expired.

31. There was delay in reporting this accident. The collision took place at 5-34 hours within station limits and the time of handing in accident message is shown as 8-35 hours.

4. BURMA RAILWAYS.

DERAILMENT OF No. 136 DN. LOCAL MIXED AT MILE 326/11-12 BETWEEN THAMYA AND LE-EIN ON THE PYINMANA-KYAUKPADAUNG RAILWAY ON THE 24TH APRIL 1931.

FROM MR. R. HATT-COOK, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A, RANGOON, LETTER No. 388/9-A, DATED THE 25TH MAY 1931. (3864-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T, dated 19th March 1930, I submit herewith a report of the enquiry held by me at Le-Ein on May 2, into the circumstances attending the derailment of 136 Down Local Mixed train at mile 326/11-12, between Thamya and Le-Ein on the Pyinmana-Kyaukpadaung Railway at 16-3 hours on 24th April 1931.

The following Officers attended the enquiry :—

F. L. F. Boeddicker, Esq., District Locomotive Superintendent, Toungoo.

A. G. Vander Beek, Esq., District Engineer, Yamethin.

R. C. Rosair, Esq., Assistant Engineer, Pyinmana.

U San Paw, District Traffic Superintendent, Toungoo.

U Maung Maung, Inspector of Railway Police, Toungoo.

Description of the accident.

The derailment of 136 Down Local Mixed occurred at mile 326/11-12 between Thamya and Le-Ein on the Pyinmana-Kyaukpadaung Railway at about 16-3 hours on 24th April 1931. The train left Thamya right time according to the line clear books and Guard's Journal, and on reaching the up outer of Thamya, the Driver shut off steam and rolled down the 6½ miles of 1 in 125 down grade. At a point approximately at the end of this down grade and at the end of a 6° right hand curve the engine crew felt a very bad bump and lurch. The driver pulled up in a distance of 600 feet. The train was running non-vacuum. The composition of the train in order was Ks engine 279, 7 goods wagons 1 water tank, 2 brakevans, 1 water tank, 2 open ballast trucks, 6 goods wagons, 1 bogie wagon, 5 coaching bogies, brakevan. The engine and two leading goods wagons did not derail, No. 3 vehicle derailed, Nos. 4 to 8 kept the track and 9 to 22 both inclusive bunched up and capsized. No. 23 leading axle derailed. Of the 5 passenger coaches, the leading coach completely capsized, the next partially and the third had the leading axle only derailed, the other two remained on the track. There were about 50 passengers in all, about 10 in the leading coach of whom 3 were slightly injured, who received attention, the majority were riding in the next coach, there were no further casualties reported or noted.

The driver on walking back noticed a broken joint on the right hand rail at the south tangent of the 6° right hand curve. The two fish bolts at the Thamya end of joint were in position also the fish plates, but the forward end bolts were missing and the forward rail was pushed ahead and twisted. The inner fish plate was badly knocked about and a strip torn off the bottom flange, with wheel marks on it, onwards the track was ripped up and displaced sideways some distance for about a length of 300 feet, and in rear of this point the track was all right, behind the B. F. S. T. 6386 the remaining vehicles kept the road, they had not reached the point where the joint had opened. The first badly derailed and capsized vehicle was the 20-ton brakevan No. 6434 the 10th from the engine and this appears to have caused the first real displacement of the track as all vehicles behind this were derailed until the point of coming to rest, the vehicle in advance was also derailed and was probably pulled off by the 20-ton brakevan 6434 capsizing.

The damage to stock was approximately Rs. 21,540 and to track Rs. 660.

The Permanent way Inspector arrived at site about ½ an hour after the accident and noticed the broken joint.

All couplings from vehicles 10 to 23 were found properly screwed up, broken shanks were found amongst the bunched up vehicles but none were flawed, a parting took place between the 6 and 7 vehicles, probably due to the drag of the vehicles in rear, the gap between was about 100 feet.

The leading 8 wagons and tank were empty and this probably accounts for them riding over the joint without derailing excepting No. 3 which was derailed. No broken or loose axles and no tyre flaws were discovered, and the only broken spring found was the right leading spring of brakevan No. 6434. There was no damage to engine or leading 8 vehicles except the buffer and coupling of the parted vehicle. Brake down gang arrived at site at 5-20 hours on 25th from Pyinmana a distance of 100 miles.

Description of the locality.

The track near site runs on a 6° right hand curve out of a cutting on to a bank about 20 feet high on the straight and into another cutting on the straight.

There is a long down grade of $6\frac{1}{2}$ miles of 1 in 125 from the up outer at Thamya only broken by two short stretches of 1 in 400 down and level about two thirds of the way down. At the Le-Ein end tangent point, which is on the bank and at the bottom of the down grade the derailment occurred. The drivers view is limited by the cutting on the curve.

The track is composed of 50 lbs., second hand rails which are hogged and bent, on good sleepers, the ballast is of about 3″ to 4″ gauge and there is no boxing in fact it is only a skin of ballast on sand packing. On checking the track in the vicinity, rail spans of 4 feet were noticed and many loose fish bolts, 2 or 3 in some joints, gauge variable, creep 5 feet and no rail anchors. The gauge and superelevation were checked by the Assistant Engineer shortly after the accident and found almost correct on the portion of curve behind the accident. There are no villages in view in the vicinity of the accident. The Inspector of Railway Police informed me that the neighbourhood is quiet, and there have been no previous records of attempted train wrecking.

Conclusions.

After weighing the evidence, and in view of the driver's and firemen's very definite statement of the bad bump and lurch, and seeing that the broken joint had one end intact the other torn away with the bolts missing, I have come to the conclusion that a gap was caused at this joint owing to creep shearing the two bolts at Le-Ein end, the joint becoming wider as the engine and 8 following vehicles passed over it until the heavy 20-ton brakevan broke up all further resistance and spread the track which was ripped up badly and displaced sideways for a length of 300 feet by the following vehicles. The weather had been extremely hot during the previous few days and the tendency to creep would therefore have been more pronounced, the track as found in the vicinity would offer little resistance to creep.

The inner fish plate had a $\frac{1}{2}$″ strip torn away from the bottom flange and wheels flange marks on it, and the holes in rail and fish plate had been under severe tension and were slightly elongated and burred, the same applied to the other side of the joint on this fish plate. In another rail with a burred end (exhibited at the enquiry) tension marks were visible in the web holes and similar conditions were noticed in another fish plate (exhibited at the enquiry). I have ruled out excess speed as being a probable cause, the driver is known to his officer and foreman as a steady sober man and has driven on the section for 8 months. The train was running to schedule from Kyaukpadaung and right time was booked for departure from Thamya, there is no need to exceed the booked speed down the long 1 in 125 grade as 30 minutes is allowed for 9 miles and if his speed had been so high as to cause a derailment, the probabilities are that it would have occurred earlier on the curve and not practically on the straight at the trailing tangent. There are also many other curves of 6° and 8° radius between Thamya and Le-Ein. The driver pulled up his non-vacuum train of 259 tons in 600 feet on a 1 in 125 down grade, the allowed speed of this section is 25 miles per hour. Nothing was found wrong with the stock to cause a derailment.

An obstruction can be ruled out as a possible cause, as none was seen and none found after the accident.

Attempted train wrecking can also be ruled out as the neighbourhood is not a criminal one, there would have been no object in derailing a local train, and the removal of two fish bolts would not ordinarily have derailed a train. The tension marks noticed on the fish plate and rail also rule over this theory.

General.

The track was cleared for linking in on 26th evening at 19-50 hours, through running was resumed on 27th morning by 135 Up. Passengers and Mails were transhipped from 129 Up into 132 Down. There was only a 10 ton crane available to clear the track and damaged stock was pulled off. The temperature during the previous 10 days and at the time of enquiry was most trying to the staff, in a waterless desert, great credit is due for the expeditious manner in which the track was cleared, and through running resumed.

Recommendations.

The track on this Branch needs a thorough overhaul. The ballast is too big for packing, and there is none available for boxing. Creep is bad and there are no creep anchors. More supervision is necessary. I have made several adverse remarks previously on the bad state of the track on this Branch.

5. BENGAL NAGPUR RAILWAY.

DERAILMENT OF RUNAWAY VEHICLES FROM KENDPOSI AT ABOUT 17/5 HOURS ON THE 28TH MAY 1931 AT CHAIBASSA.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 2052/XIII/31, DATED THE 30TH SEPTEMBER 1931. (3889-T.)

I have the honour to report for the information of the Railway Board in accordance with Rule 7 of Notification No. 1926-T., dated the 19th March 1930, the result of my enquiry into the derailment of runaway vehicles from Kendposi which occurred about 17-5 hours on the 28th May 1931 at Chaibassa on the Bengal Nagpur Railway.

2. A Joint Enquiry was held on the 12th June 1931 and the evidence recorded thereat was accepted by me; I held an enquiry at Kendposi on the 23rd July 1931.

Description of the Accident.

3. On the 28th May 1931 about 16-25 hours while shunting operations were in progress at Kendposi 9 vehicles rolled away; they continued on for some 21 miles through Jhinkpani upto Chaibassa where about 17-5 hours they were derailed and capsized on the second line by colliding with 12 other vehicles stabled on the third line. The Station Yard was blocked for about 14 hours before normal working was resumed.

One brake van was wrecked, one wagon badly and 19 vehicles slightly damaged; the track was badly damaged for some 350 ft.

The total cost of damages was Rs. 11,430.

4. The weather was fine and clear. The train consisted of 29 vehicles drawn by Engine No. 284 H. Class and weighed in all some 600 tons.

Description of the locality of the accident.

5. Kendposi is a non-interlocked station with two loops and a goods siding taking off the platform line; it has outer signals only.

The Yard is on a falling grade of 1 in 500 from near the facing points at the Gua end to just beyond the outer signal at the Amda end; there is a short stretch of level beyond for 500 feet and thence falling grades of from 1 in 100 to 1 in 400 upto Chaibassa; a few short stretches of level and counter grades are interspersed. The difference in levels between Kendposi and Chaibassa is some 675 ft.

6. Neither Catch or Slip Sidings exist at Chaibassa, Jhinkpani and Kendposi. Of the nine stations on this branch all but one are located on grades of 1 in 400 to 500; in addition eight of them have steep grades of 1 in 60 to 1 in 250 falling away from the yard in one direction; there are Catch Sidings at two stations only.

Conclusions.

7. The train left Tatanagar with 31 vehicles fully vacuumed, at Amda 10 vehicles were detached and 12 attached; Driver Kormanayakulu informed Guard Bose he had had trouble in maintaining vacuum and with his permission, the rear ten vehicles were made non-vacuum before the train left Amda. Guard Bose states he received a memo. from Driver Kormanayakulu at Amda regarding the exclusion of these vehicles from the vacuum, but the latter states he gave it at Kendposi in the presence of the Station Master Mukerjee. The last named denies this and Guard Bose's version must therefore be accepted, it is difficult to understand why these mis-statements were made.

8. At Chaibassa shunting was done, five vehicles were detached and the train finally proceeded to Kendposi with a load of 28 vehicles. The train was admitted on the Station Loop at Kendposi and after unloading packages it was backed

towards Amda to detach two vehicles, during this movement nine vehicles in rear rolled away.

9. Guard Bose admits he was in charge of the shunting operations with Jamadar Nildahar assisting and that the latter who was on the off side of the train signalled the train back without his orders. Station Master Mukerjee and Driver Kormanayakulu state Jamadar Nildahar was on the same side as the Guard; Guard Bose's evidence on this point must therefore be rejected; it is a poor attempt on his part to evade responsibility.

10. Guard Bose states he ordered Pointsman Damodar to pin down the brakes of ten vehicles and screw on the van brake; the latter admits the first portion of the order and denies the second. He had to set and man the points, Guard Bose was close to him and should have seen that he had done nothing, moreover from the fact that the vehicles rolled away the brakes were not on and Guard Bose must therefore be held responsible for not taking any precautions and for breach of Subsidiary Rule 148 E (2) d.

11. Several vehicles on the train had Willison couplers and it was owing to the release of one of these that the train parted. The type in use had a lever with a horizontal uncoupling arm resting in a slot on a rest, the arm was continued on and turned down at right angles to form a handle. To disengage the coupling the handle is lifted vertically off the slot and then turned upwards and away from the vehicle through an arc of about 60 degrees; the first movement and part of the second is easily done but the final action requires some force to move the massive lock between the knuckles of the coupler, up its inclined plane seating. On letting the handle go it drops back into the slot on the rest in its normal position, at the same time the lock remains in the lockset position until the vehicle is uncoupled when it should slide down into the engaged position. I actually tested about a dozen couplers and found the latter movement did not occur in several cases. If the lock is to be left in the disengaged or lockset position the release lever must be pushed inwards and towards the vehicle; a special shelf is provided for this purpose but is not fitted on the B. N. R. vehicles.

12. The members of the Joint Enquiry came to the conclusion that the release of the lock of the coupler was an accident caused by some person passing under the train and inadvertently lifting the release handle, I disagree with this view for the following reasons :—

(*a*) As shown above the final movement of the handle requires some force to lift it into the release position; the action therefore must have been a deliberate and not an accidental one.

(*b*) It is curious coincidence that the parting of the train occurred at the junction of the vacuum and non-vacuum vehicles; this seems to indicate that the person who tampered with the coupler knew what he was about and had some motive behind his action.

(*c*) The knuckles of the Willison coupler are very massive and project downwards and as screw couplings are also fixed and hang down an easy passage is not afforded to a person passing under a train; one would ordinarily seek a portion that offered the easiest and clearest way, why therefore was this obstructed portion selected.

(*d*) The action of the lock in the Willison coupler is not generally known and it must therefore have been tampered with by some person who was acquainted with its working.

From the facts cited above I consider that the Willison coupler was disengaged deliberately by some person with malicious intent.

13. Subsidiary Rule 148 A-E, Section G, Chapter III lays down rules for the control of shunting, I consider that special rules for ghat sections should be framed in accordance with the practice on other railways, to include the following :—

(*a*) The van brake must be manned during the entire operation of shunting,

(*b*) No person other than the Guard shall on any account give a signal to the driver to shunt, when he is in charge.

(*c*) A special form should be issued by the Station Master and signed by the Guard and Driver unless Fixed signals control the movements of the train.

(*d*) When loose shunting of vehicles is done it must always be against others that have been adequately braked and spragged.

(*e*) Other details *re* attaching, detaching, spragging, exhibition of lights, etc.

(*f*) Incorporation of Subsidiary Rule 129-A.

Shunting operations are always going on and being a fruitful source of accidents too much detail cannot be considered superfluous.

14. Station Master Mukerjee and Guard Bose had a very hazy idea of grades prevailing at Kendposi and in consequence failed to appreciate the danger in shunting; they had no ready means of knowing the grades and it is important that this information be furnished as simply as possible either on the station diagrams or in statements.

15. Guard Bose became an independent guard early in 1930 by merely furnishing a letter to the Station Master at his headquarters that as he had been working on the section for some time he knew the road and wished to go out on his own. He was not put through any test and on his bare statement was allowed to work in independent charge; at my enquiry he was unable to answer any questions put to him regarding grades, etc., and frankly admitted he did not know the road. It is manifest that the procedure outlined above is faulty and not without risk in the working of trains and it is important that it be put on a proper basis.

16. Guard Bose should have had a complement of sprags as part of his equipment *vide* S. R. 102 (B); actually he had none and has never had any since working as a guard, *i.e.*, for 18 months. This points to stricter control being exercised in the matter of inspection of guard's equipment.

17. The absence of catch and slip sidings on this section with steep grades extending continuously for miles is typical of conditions generally on the Bengal Nagpur Railway and it is not surprising therefore that vehicles roll away from stations. From 1st January 1931 to 30th June 1931 there have been nine such accidents at Jharsuguda, Parlakimedi, Jonk, Sonder, Khargpur, Bhowra, Garpos, Chattikona and Kendposi; the last two resulting in serious loss of life and property. It may be urged that in all cases the accidents were due to breach of rules, that is quite true, but safety sidings are intended to circumvent such breaches and their absence cannot be viewed with equanimity.

18. Footnotes (*b*) and (*c*) to Questions 56 and 57 Form IX, Rules for the Opening of a Railway permit the use of steep grades close to stations and make the provisions of safety sidings optional; it is obvious the administration has taken advantage of these sections and done as little as possible to keep down costs; so long as this policy continues accidents must occur and the only remedy is to make the regulations more stringent. Paragraph 16, Section B of the Requirements for Passenger Lines of the Minister of Transport, London, lays down suggestions for safeguarding trains at or near steep grades which I understand are freely resorted to by administrations on their own initiative and it would be as well if a more liberal policy was followed in India.

19. Frequent restrictions hamper operating work and if the loss due to engines and vehicles standing by is capitalised it will probably be found that the provision of safety sidings is more than financially justified apart from the security afforded, which is of paramount importance.

20. Catch sidings are of less importance if trains are run vacuumed throughout as in the event of a break away the vacuum brake automatically comes on and holds for about 30 minutes, ample time for a guard to pin down brakes and apply sprags. Moreover with the vacuum brake the danger of a train, approaching a station on a long steep grade, getting out of control is a remote contingency.

Slip sidings are a necessity as inspite of all prescribed rules breaches of them constantly occur and there is no other safeguard available. " Prevention is better than cure " is a maxim that merits more attention especially as a safety siding is a low-priced high-grade insurance.

21. It was stated that the majority of trains on this branch run vacuumed and this was one of the few that run non-vacuumed, it is manifest that it would be safer to detach vehicles to ensure vacuum throughout rather than run any

risks. Considering that this train started from Tatanagar, some 27 miles from Amda, where there is a large loco. and train examining staff it points to stricter supervision being exercised to see that a train is in thorough order before it sets out; the maxim "a stitch in time saves nine" applies with even greater force on railways than elsewhere.

22. As Willison couplers are so easily disengaged it may be worthwhile laying down that before a train equipped with them proceeds to do shunting it should be drawn ahead to see if it is intact. If such a precaution had been taken in this case the parting of the train would have been detected.

23. It is not generally known that on grades of 1 in 600 vehicles are apt to roll away, and where stations are on grades steeper than this the staff should be warned and suitable working rules framed and enforced.

Recommendations.

24. Special rules for control of shunting operations on ghat sections should be drawn up.

25. A more liberal policy as regards provision of slip and catch sidings should be followed.

26. If the Willison coupler is not to be fitted generally in the near future the question of removing it from the few vehicles equipped might be considered unless complete rakes of them can be maintained. Apart from being too easily disengaged they are a source of danger to the staff in coupling up with another vehicle as the buffers gape for about 6 inches and men get caught between them.

6. BURMA RAILWAYS.

DERAILMENT OF No. 3 UP MAIL AT MILE 116/10 BETWEEN PENWEGON AND TAWGYWE-IN ON THE RANGOON-MANDALAY MAIN LINE AT 23/7 HOURS ON THE 1ST JUNE 1931.

FROM MR. R. HATT-COOK, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, RANGOON, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 423/11-A, DATED THE 9TH JUNE 1931. (3892-T.)

In accordance with Rule 7(2) of Railway Board's Notification No. 1926-T, dated 19th March 1930, I submit herewith my report of the enquiry held by me into the circumstances attending the derailment of 3 Up Mail at mile 116/10, between Penwegon and Tawgywe-In on the Rangoon-Mandalay Main line at 23-7 hours on 1st June 1931.

I held my enquiry at Toungoo on the 4th June 1931. The following officers attended the Enquiry :—

F. L. F. Booddicker, Esq., District Loco. Superintendent, Toungoo.
C. B. Hayes, Esq., District Engineer, Toungoo.
U San Paw, Esq., District Traffic Superintendent, Toungoo.
G. W. R. Strickland, Esq., Assistant Engineer, Toungoo.
K. W. S. Skelton, Esq., Assistant Traffic Superintendent, Toungoo.
Dr. M. Y. Begg, Railway Sub-Assistant Surgeon, Toungoo.
L. T. Wilson, Esq., Superintendent of Railway Police, Rangoon.

Description of the Accident.

The accident occurred at mile 116/10 at the site of a 3 × 10′ girder bridge No. 170 about midway between Penwegon and Tawgywe-In, on the Rangoon-Mandalay Main double line at about 23-7 hours on June 1st 1931. It was a bright moonlight night. The engine headlights were burning brightly. The train stopped at Penwegon at 22-58 hours and left at 23-1 hours right time and at a distance of two miles onwards the driver experienced a severe lurch to the left and then to the right, and the engine (No. Js 239—4-6-0 passenger tender engine) after travelling for about 216 feet fell over on its side on top of the down line but was not badly damaged. The driver kept his head and managed to close the regulator with his left leg which happened to be hooked over it, by the capsizing of the engine. Both he and the firemen had miraculous escapes. When the engine came to rest the driver crawled out, and went to see what had happened, and to help the passengers. At a moment preceding the capsizing of the engine, the driver was thrown against the cab side facing across the engine, and he definitely stated, that at this moment, he saw three men in white walking away into the forest, he could not make out their nationality. This was also confirmed by a passenger.

The first two bogie coaches were thrown at right angles to the line, the third coach lay on its side, parallel to track and the fourth spanning the small bridge of 3 × 10′ girders, also on its side and down in the waterway, the fifth coach derailed but remained upright, the leading bogie overhanging the south abutment of the bridge. The first four coaches were very badly smashed up and all were lying on the left of track, the body of the second being parted from its frame. The remainder of the train kept the rails. In spite of this damage there were only ten casualties, all of a minor nature except two.

The District Superintendent of Police, Pegu, was a passenger on the train and he together with the driver examined the track and found that the south joint of the rail immediately preceding the bridge, had been disconnected, the rail being lifted onto one of the fish plates placed at right angles on the joint sleeper and slewed outwards about the width of a rail head and held in this position by a spike driven through the fish plate bolt hole into the sleeper, this fish plate was

seen in position by the District Engineer, Toungoo, later. At the forward joint of the same rail three bolts had been removed, the fourth remaining in position holding the two fish plates, which were badly bent. This same rail was lying parallel to and 5 feet from the track unbent, and with a wheel mark on the end and the inner edge, and had not been touched before my arrival. It was partially buried in ballast and on turning it over the outside portion of a sleeper was still attached to it with the spike in position, the other sleepers were so badly smashed up, that it was impossible to determine how many spikes had been removed to spring the rail outwards. The forward joint of the next left hand rail ahead which is the very joint opened the day before had also been unfished, and through one of the holes a piece of fencing wire was found, as also round the corresponding joint of the right hand rail. This second left rail was buried under the coach spanning the bridge, and badly bent. The left rail ahead was fished up, and had threaded itself through the end of third vehicle No. 9758. The joint of the right rail ahead of the bridge was found broken, and this was most likely burst open by the engine, as the bolts were found badly bent and tensioned, otherwise the right hand rail was fished up.

I examined the bolt holes of the rails and fish plates of the left rail dismantled joints and found no trace of any applied force, so they were obviously opened by hand. The bridge had its south pier knocked over most likely by the leading bogie of the fourth coach, the one piece bedstone being unfractured, the brick-work being in big lumps. I could detect no sign of explosive, and apparently the loud bangs heard by the guard and driver were due to the derailment, and the bogie hitting up against the pier. The girder ends fell into the waterway. Several bolts and nuts were picked up by the District Superintendent of Police, Pegu and the District Engineer, Toungoo and found undamaged and a fish plate was found 50 feet to the right, and opposite the first dismantled joint, undamaged, and another under the vehicle spanning the bridge also undamaged. Some bolts and nuts were produced at the enquiry, by the District Engineer and were found to be quite undamaged, and they had been opened by hand. The bridge was stripped of sleepers which were piled up at the north end of bridge and some of the wheels rode on the girders. The engine coupling broke, and both couplings of the leading coach, the remaining couplings were bent.

The engine headlight and the lights in the train were burning after the accident.

The wreck was protected by the guard and driver in front and rear on both tracks. All possible assistance was rendered to the injured and they together with the greater number of passengers were taken away about 4-30 hours in charge of the District Medical Officer, Toungoo.

Two accident specials arrived about 4-30 hours and the steam crane from Malagon about 9 hours accompanied by the Chief Engineer and Deputy Locomotive Superintendent and Traffic Officers.

Through communication was restored at about 20 hours on the down line on June 2nd by 1 Up Express. The speed of the train was said to be about 30 miles per hour at time of accident. The train was vacuum braked throughout. The approximate damage to Rolling Stock and tract is Rs. 39,400.

Description of the Locality.

The line runs straight for many miles, at site of accident it is on a down grade of 1 in 600, and on a 4-foot bank, and 50 feet beyond the first dismantled joint the track is carried over a small waterway on 3 × 10′ girders, on brick piers and abutments. The line enters a thick forest about half a mile before this bridge, which is cleared to about 50 feet either side, the line is fenced. The track is composed of 60 lb. rails on hardwood sleepers of which a fairly high percentage are unserviceable. Several fish bolts were found loose, creep anchors are provided, ballast is ample. The gate lodge burnt down the previous night is half a mile south, *i.e.*, at the entrance to the forest, the damaged gang hut being opposite, and the neighbourhood is known to be a bad one.

Conclusions.

From the evidence obtained at the enquiry and owing to the fact that the District Superintendent of Police, Pegu, the District Engineer, Toungoo and Bridge

Inspector also the driver were all eye-witnesses to the dismantled joints of the rail immediately south of the bridge No. 170 with the fish plate placed on the joint sleeper of the south joint, and also seeing that the District Superintendent of Police, Pegu and District Engineer, Toungoo, picked up several bolts and nuts undamaged, and later two fish plates were found undamaged and which articles were exhibited at the enquiry, also owing to the fact that this left hand rail was lying parallel to and 5 feet to left of track undamaged with a distinct wheel tread indentation on its head at the south end, there is no doubt that the accident was caused by disconnecting both of the joints of this rail, which was also slewed out of line and lifted onto a fish plate resting on the sleeper by some persons unknown.

It is also proved that the joint of the left rail on the bridge was completely disconnected and had also been disconnected the previous night. One of its fish plates was found undamaged. All the holes of the dismantled joints which I examined carefully were unmarked by any applied force.

The train chosen, and the site and the method employed is enough to indicate that the gang is expert in methods of train wrecking, and is most likely the same gang that wrecked 4 down on October 28th 1930 at mile 144/17, as the methods employed bear an extraordinary resemblance.

I am unable to explain the reason for binding fencing wire round the right rail joint, and the corresponding joint of the left rail on the bridge which was disconnected, it may however have been done to pull the track out of line over the bridge. Anyway the engine and coaches were derailed before they reached the bridge.

Some spikes must have been removed from the first rail to spring it out of line, but it was impossible to say which, as they were so broken up. It is a cunning way of doing the job, for the driver would be unable to detect anything wrong with the track, and would get no warning, such as with a rail removed entirely. The bridge was swep tclear of sleepers and some of the wheels were riding on the girders. It is possible that all hook bolts were removed on one side, but again this is impossible to ascertain.

In the section between Pyuntaza and Toungoo during the last 2½ months, sixteen cases of murder, robbery and arson have occurred in Railway premises, also three cases of tampering with the line in four days, one of which wrecked 3 Up.

A wire was sent by Station Master, Penwegon on June 1st, informing about the burnt down gate-hut, and partly burnt gang-hut, also the dismantled joint on bridge No. 170. A copy of this was handed to the Military Police, Penwegon, and it was received by the Railway Police. The same night after the receipt of this wire 3 Up was wrecked.

Lawlessness prevails, and the Indian gangmen have been terrorised, and molested during the day, and threatened with their lives unless they leave the country, and I consider these men should be protected while carrying out their duties, for the maintenance and safety of the track must be assured especially so during the rainy season, to protect the travelling public, and to keep open this main line of communication.

The Railway Administration have stopped night running for a few days. This has been resumed on 19th instant at a reduced speed of 15 m.p.h. and with a pilot train in advance carrying an armed guard.

General.

The arrangements for tending the injured and evacuating them were good.

Officers were soon on the scene of accident, and the down line across which the engine lay was cleared for traffic about 21 hours later.

Arrangements for carrying on traffic were well looked after by the District Traffic Superintendent, Toungoo, and transhipping was carried out expeditiously.

The driver displayed great presence of mind, and deserves to be highly commended for his conduct throughout and for the smart way in which he managed to shut off steam and apply the brake.

He warned his fireman to be on the alert after Penwegon, knowing the district to be a bad one. He no doubt was on the alert himself, for he saw the burnt

down gate-hut yet he saw nothing wrong with the track, although his headlight was burning brightly, and this more or less goes to prove that the method adopted to derail the train was invisible to the driver.

The gross weight of the train was 330 tons, and there were about 200 passengers. All the injured except one were in the leading coaches.

The District Superintendent of Police, Pegu, rendered great help to the injured, and took the wise precaution of protecting the train with the only available trained men handy, and also sent a message to Penwegon for help.

Through communication on the up line was restored on June 19th.

Recommendations.

Permanent way and other gangs should be protected as far as possible during their work hours.

As the track can be so easily tampered with during the night, it would be advisable to have armed patrols in the worst sections accompanied by two or three gangmen to inspect the track before the passage of the principal trains.

7. BENGAL NAGPUR RAILWAY.

FATAL ACCIDENT TO COOLIES ON BALLAST TRAINS ON THE THERUVALI-TITLAGARH CONSTRUCTION ON THE 23RD JUNE 1931.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 2037/XIII/31, DATED THE 30TH SEPTEMBER 1931. (3924-T).

I have the honour to report for the information of the Railway Board in accordance with Section 148 of the Railways Act and Rule 7 of Notification No. 1926-T., dated the 19th March 1930, the result of my enquiry into the collision between a ballast train and some runaway vehicles which occurred about 18-50 hours on the 23rd June 1931 at mile 142 on the Raipur-Vizianagram Construction, Bengal Nagpur Railway.

Description of the accident.

2. On the 23rd June 1931 about 18-50 hours while Ballast Train No. 1 with some 300 coolies aboard was being pushed to Chattikona it collided near Mile 142 with 21 runaway vehicles loaded with rails and sleepers. One pair of wheels of 3 of the runaway vehicles was derailed; the brakevan of the ballast train—which was leading—was damaged; the fifth vehicle from the brakevan capsized, crumpled up, turned turtle and came to rest on the sixth one, the fourth one was staved in and was up ended on the fifth one; both the latter were pushed out laterally off the track.

3. One man was crushed to death in the fourth wagon, and three men killed in the fifth wagon; three men and a woman were pinned between the fifth and sixth wagons and very badly injured, they were extricated alive after 12 hours exposure but succumbed to their injuries shortly after.

The Ballast Train No. 1 had some 300 coolies on it and was said to be returning to Chattikona on an oral working line clear.

4. The 21 vehicles which escaped were standing outside the facing points at Chattikona; 15 were on the grade of 1 in 700 and 6 on the 1 in 125 grade. The brakes of 4 of the latter were defective and of no use; the remainder were more or less in order.

The weather was stormy and rainy and visibility was poor.

Description of the locality of the Accident.

5. From Theruvali—the temporary terminus of the section open to traffic—the line rises at 1 in 100 to Mile 140·5, falls at 1 in 700 to Mile 141·2, at 1 in 125 to Mile 142·1 and continues to fall at 1 in 125 for 7 miles with short stretches of level interspersed. Chattikona station is located at a summit on a 1 in 700 grade and steep grades extending for miles on either side, fall away at 1 in 100 and 1 in 125 respectively from 350 ft. outside the facing points. The yard is provided with a loop line, no signals are in use and there are no slip sidings, it is 12 miles from Theruvali.

System of Working.

6. Telephones have been installed at Rayaghada and Theruvali—both on the open line—and at Chattikona in charge of telephone clerks who receive and transmit messages and issue oral line clears. Beyond Chattikona the telephone line is extended to rail head as it moves forward and communication is kept up.

The ballast trains have a wall phone in the brake van with the earth-wire connected to a brake block of the van, the guard has to keep in touch with all points by putting on his brake and hooking his lead wire to the telephone line beside the track. For a distance of some 1½ miles between Mile 140-142 the latter is too far away for the necessary connections to be made and it is due to this that

the guard was unable to send earlier news of the accident to Chattikona, much valuable time being lost.

7. An Inspector of Trains is stationed at Theruvali and on receiving orders from the Assistant Engineer as to work to be done he transmits messages to guards of ballast trains directing them where and when to work. These messages are recorded and delivered by the telephone clerks. On receipt of the orders the guards proceed to their destinations, connect up their telephones and advise the Inspector of Trains and the Engineer of their movements. If any marshalling or shunting of the trains had to be done before, after or during the day's work, the guards did it on their own responsibility without any control.

8. The guards and drivers of the ballast trains have all had experience of working of trains on the open line; orders were issued to them by the Inspector of Trains that they were to personally supervise shunting, that fly shunting was forbidden and that marshalling was to be carefully done so as to avoid risk of runaway vehicles; no detailed instructions regarding method and control of shunting were issued at any time and it was presumed that with their past experience the guards would take any precautions necessary. This assumption was falsified by the action of Guard Lakshmaiah cutting off vehicles and leaving them on a 1 in 700 and 1 in 125 grade without taking any precautions.

9. All ballast trains were non-vacuum and the majority of the vehicles on them had hand brakes operative on two wheels; the hand brake lever was retained in position by engaging in notches on the brake rack, some vehicles had pins for securing the levers in position on the guard; the brakes of all but four vehicles were more or less in good order.

10. There were three ballast and material trains Nos. 1—3, working on the section Theruvali to rail head a distance of 22 miles. When two trains are required to work in the same block section the latter is nominally divided into two sub-sections with fixed limits; one train then proceeds into each sub-section stops at a selected spot and the telephone on the train is connected up with the main wire; as a precaution, banner flags are put up on either side of a train. Each train is considered a station and the guard in charge a station master. It will be seen that the original block section which was intended to be split up into two sub-sections has really been split up into three as two artificial stations are created with the real stations at each end; the central portion becomes a no man's land. The guard of a standing train, being considered a station master, issues orders to himself to proceed! When either of the trains has completed its work in a sub-section the guard notifies all concerned that he intends moving and obtains oral line clear to return to a station if he has not a working line clear; in any case he gives advice of his movements before moving.

11. It is claimed that the system cited above is a modification of General Rules 82-89, Chapter VII of the General Rules for working Railways under Construction. It actually comes under the ultimate para. of General Rule 73 which provides that " ... when circumstances are exceptional, ordinary working may be *temporarily* suspended . . and the trains thereon be worked under such special regulations for their safe conduct, ... ". The obvious intention of this rule is that the procedure should be the exception not the rule and only in an emergency; as a matter of fact it was the general practice followed in all cases of more than one train working on the same block section.

For the section Chattikona to rail head special working rules should have been drawn up as those prescribed in paragraph 73, Chapter IV of the General Rules, are not applicable in such cases; actually no rules were framed.

Conclusions.

12. The evidence as to how the vehicles escaped from Chattikona is conflicting; they were under the charge of Guard B. H. Lakshmaiah (B. T. 3) who, some of the witnesses assert, was present conducting shunting operations while others state he was not and I consider he must be given the benefit of the doubt.

13. Conflicting evidence has also been given about the fixation of brake levers of the vehicles and one can only reject all of it; the final position was that the vehicles rolled away and for this to have occurred they could not have been

adequately secured; Guard Lakshmaiah must therefore be held to blame for the escape of the vehicles from Chattikona.

14. Guard Lakshmaiah states that he was working without a brake van though he asked for one. Inspector Nidhan Singh admits these facts and though one of the other trains had two brake vans he had not the common sense to remove one and hand it over. As regards the supply of chains and sprags Guard Lakshmaiah states he was not supplied with any and actually had none. When Inspector Nidhan Singh was first questioned about equipment supplied he did not mention these articles, when questioned further he states he supplied them. He can produce no record, which one would expect him to have, and his excuse for not having it is a very poor one. Guard Lakshmaiah is not likely to do away with such articles and in the face of all these facts I consider Inspector Nidhan Singh's evidence must be rejected and he must be held to blame for non-supply of the brake van, chains and sprags. The engineers were also aware that Ballast Train No. 3 was working without a brake van.

15. Guard Webber (B. T. 1) asserts he was ordered by Inspector Nidhan Singh to bring his train into Chattikona after he informed the latter of his intention to do so; Inspector Nidhan Singh denies this and the only other witness who could have corroborated the evidence of either was Telephone Clerk K. Somayazulu who overheard part of the conversation between the Inspector and the Guard but conveniently missed the relevant portion. He states Guard Webber told him to inform Inspector Nidhan Singh that he was stabling his train at Mile 143 for the night; the latter acknowledges having received a message from the guard direct and states he *advised* him to come into Chattikona. Guard Webber denies having said that he intended to stable in the cutting but Inspector Jachuk says he overheard something about stabling in a cutting—he was not on the phone, however, and may have missed the purport of the conversation.

16. Inspector Nidhan Singh states he was absent at Rayaghada on 23rd June 1931 and only returned to Theruvali about 16/30 hours, he was then unaware of the position of the three trains and when Guard Webber called him up he apparently overlooked this fact. In the face of this contradictory evidence one must look for a motive behind each man's evidence. It is quite clear both Guard Webber and Inspector Nidhan Singh are trying to evade responsibility and seeing that a conversation did take place between them about stabling and that the ballast train was actually proceeding to Chattikona one can only conclude that it was the outcome of a mutual arrangement; it must also be recognised that guards usually asked for orders from the Inspector of Trains regarding their trains and acted on them; it was the latter's duty to give orders.

17. From the facts cited above I consider that Inspector Nidhan Singh and Guard Webber must share responsibility for the orders regarding Ballast Train No. 1 moving towards Chattikona. The responsibility for the method followed in bringing the train in must rest on Guard Webber alone; it was his duty to advise all concerned which he did not do and he must be held to blame entirely regarding the actual movement of the train. It must be admitted in his favour that he had an oral working line clear authorising him to return to Chattikona.

18. The System of Working adopted has been described in paragraph 12 above as a modification of General Rules 82-89, Chapter VII of the Rules for working Railways under Construction, I have perused the rules and can find no relation between the two especially as regards the safeguards prescribed in the Rules. General Rules 82-89, Chapter VII, are primarily intended for the movement of trains in the same direction and following each other, such conditions only existed in certain cases; trains generally were permitted to simultaneously enter a block section at each end and thereby rendered the rules inapplicable. It would be more fitting to describe the system as coming under the ultimate part of General Rule 73 or General Rule 72 but in reality being an incorrect interpretation of it as the last three lines of General Rule 72 were not acted on.

19. Again the methods of working prescribed in Chapter VII presuppose the establishment of Station Masters or qualified men in lieu; on this construction none of the staff except Guard Webber were qualified in the working of trains. Further it is explicitly laid down that proper forms in book form are necessary *vide* General Rule 117—actually none were in use and oral telephone messages

were the medium of communication. General Rules 46, 119, 123, 125, 128 and 129 were to all intents and purposes completely ignored.

20. No detailed instructions either regarding the System of Working or the Control of Shunting Operations were issued to the staff by an authorised officer; the Inspector of Trains indulged in a few platitudes in some letters to guards of ballast trains. It has been contended that if Guard Webber had sent intimation of his intention to move to Chattikona shunting would have been suspended and no accident would have taken place. That may be so but if Guard Webber had stabled at Mile 143 shunting would have gone on and the vehicles would have rolled away and collided with his train just the same, though the results would have been far more serious as the section is on a more or less continuous falling grade.

21. I consider that the crux of the system of working adopted was the non-observance of safeguards essential to safe working, when allowing trains to simultaneously enter or work on the same block section; as there was no system of caution orders or blocking of a section.

22. Such action cuts at the root of all measures for safe working and when to this is added the fact that—

(*a*) none of the staff were qualified in train working;

(*b*) no forms were used for train working;

(*c*) no register of movements of trains was kept;

(*d*) no qualified person gave detailed orders regarding shunting in station yards;

(*e*) guards were left to send for themselves in shunting and marshalling trains;

(*f*) adequate equipment had not been given to Guard Lakshmaiah;

(*g*) no brake van had been supplied to Ballast Train No. 3;

it is not surprising that a serious accident did occur; it is a wonder one did not occur earlier.

23. It cannot even be urged that the staff, *viz.*, the Trains Inspector and 7 telephone clerks, were a measure of economy; if a qualified Station Master had been posted at Chattikona he could have done the work performed by the Inspector of Trains and been responsible for work in the yard; he could have had one Assistant Station Master to assist. The Station Master at the Head Quarters of the Assistant Engineer would have avoided any telephone and staff at Theruvali, one extra Assistant Station Master could have been posted here to ensure continuous working of the telegraph or telephone and a similar arrangement could have been made at Rayaghada.

24. Such an arrangement would have ensured qualified men, continuous duty and been more economical; in the present case with a bigger staff, continuity of duty was absent and was partly responsible for the delay in extricating the injured persons. The telephone system too was not satisfactory as there was no real indication as to who was conversing; moreover, when two persons were on the phone others could cut in and conflicting orders could be received. There should have been a selector arrangement at Chattikona which when any one rang up for a particular person the telephone clerk could plug in to ensure that no one else interrupted.

25. Apart from the culpability of certain of the subordinate staff there is the wider issue of the general responsibility of the Officers concerned. General Rules 72 and 73 explicitly state "Under special instructions" certain measures may be introduced, but this can only be done under the orders of the "authorised officer", *vide* General Rules 1 (23) and 2 and for the failure to comply with these orders the administration must apportion the blame; it must fix responsibility and ensure that trains are worked with due regard to safety. I do not consider that adequate measures were taken by the issue of letters giving a few general instructions or by oral communications; safety in railway working can only be secured by framing proper regulations and issuing them to the staff. The General Rules for Railways under Construction prescribe systems of working, and departures there-

from under the authority of responsible officers and it is incumbent on the latter to supplement the General Rules when occasion arises.

26. It is usual to have hundreds of coolies on ballast trains and these unfortunate persons must be adequately protected. It is not right that their lives should be left to the tender mercies of unqualified subordinates ; officers have been placed in positions of trust and responsibility and they must act upto their positions. It is not surprising that when this accident occurred the coolies on the train showed resentment at the death of their fellow workers.

27. Inspector Jachuk suggested certain measures after the accident to liberate the coolies pinned in the wreckage but his advice is said to have not been feasible and could not be acted on owing to the refusal of Fireman E. Simhachalam to move his engine ; the fireman contended that if the engine was moved the capsized vehicles would lose their support, fall down and crush the injured coolies ; it seems incredible that when the lives of people are at stake that a man should have the power to act like this and steps must be taken to see this does not occur again. It must be impressed on the staff that when human lives are at stake they must not insist on formalities such as an officer or the police being present before anything is done. In this case there was no doubt of the cause of the accident and as there were two inspectors and two senior drivers on the spot immediate action should have been taken.

28. The accident occurred at about 18-50 hours, advice was received at Chattikona, 1 mile away, about 20 hours and a light engine was sent off about 22 hours to Rayaghada and arrived there about 0-45 hours. Had there been staff on night duty intimation could have been sent by telegraph to Rayaghada advising the engineers of the accident and giving them time to collect staff, tackle etc. ; some time could have been spent on collecting stores and the engine could have returned at once and saved some hours delay. The engine left Rayaghada at 2-30 hours and arrived at the scene of the accident at 5-0 hours with a certain amount of hustling all these timings could have been improved on and a saving of some 4-6 hours should have been effected.

29. It is much to be regretted that a lack of judgment was shown by the engineers at Rayaghada in not taking out wire rope in the first instance ; much valuable time was lost by this omission and it should be impressed on all concerned that it is better to take superfluous articles rather than too little ; the extra time involved in loading up is negligible and as has been proved in this case some articles subsequently taken were absolutely necessary in the first instance.

30. An irregularity which came to light was the fact that Fireman Simhachalam (B. T. 1) was not qualified to drive an engine, he was only a passed fireman and should not have been allowed to work a train ; his refusal to move his engine was probably due to a lack of confidence in himself, had he been a man of experience he might have sized up the position and been more amenable to reason ; where there is only a small staff available men like firemen, brakesmen, etc., should be fully qualified to take the place of drivers and guards when necessity arises, and they should have experience of the duties they may have to undertake. It may not be generally known that an unqualified person driving a locomotive commits a criminal offence.

31. Several of the witnesses have stressed the fact that adverse conditions in the shape of wind and rain prevailed ; Guard Lakshmaiah had the advantage of two engines for doing shunting, yet in the face of his open line experience and to the existence of steep grades beyond the facing points, he had not the common sense to place an engine at the extreme ends of the station with the vehicles between while shunting. He did not even borrow sprags from Ballast Train No. 2 or take suitable precautions (*vide* General Rule 64) to secure loose vehicles on a steep grade ; shunting operations had apparently been conducted in this way showing the absolute necessity for proper rules and adequate supervision. He admits ordering Brakesman G. Dalayya to pin down brakes but did not see whether the orders were complied with ; he also allowed the brakesman to signal the driver when he should have done this personally.

32. Guard Webber's admission that after loading his train at the moorum quarry he proceeded to other places to unload without advising anyone, is typical of the conditions prevailing. He was aware of the fact that under the system

of working another train could have entered the same block section yet he did not take any safeguards.

33. Inspector Nidhan Singh states he was informed of an accident about 19-30 hours by Telephone Clerk Somayazulu and was given details at 22-30 hours by him ; the latter states he only got information between 20-15 and 20-30 and advised the former at 21-30 hours. Guard Iyer states he heard of the accident shortly after 19-30 hours and saw the doctor going out ; he then went to the phone which was unattended and tried to get Rayaghada about 20 hours. Inspector Nidhan Singh also states he gave orders at 19-30 hours to Telephone Clerk Somayazulu to remain on duty all night ; the latter states he left duty at 20 hours and Guard Iyer confirms this.

There is no doubt some one's evidence is mendacious and it is difficult to understand why mis-statements are made regarding such incidents. I consider that Inspector Nidhan Singh's evidence on these points is a fabrication. If he had been informed at 19-30 hours he would have got details at once as a light engine had returned from the scene of the accident for the doctor ; unless persons were injured why was medical aid summoned. His evidence on this and other points is thoroughly unreliable and the sooner he is relieved of the position he occupies the better.

34. No signals, boards or other marks had been erected at Chattikona to indicate the station limits and section and in the absence of these the outermost facing points formed the station limits and section. Such being the case the shunting of any vehicle beyond the points amounted to movement into a block section already occupied by a train, this is a distinct breach of General Rule 63 but in the circumstance was unavoidable though irregular and was overlooked by all concerned.

35. After the accident the District Engineer found that four of the rail trucks had defective brakes and yet they had been shunted on to a 1 in 125 grade. On a section like this where steep grades are very prevalent it is imperative that brake gear be kept in good order and steps must be taken to ensure this ; it should be made obligatory for guards to test the brakes before the day's work is begun. The question of fitting pins for securing brakes must also be looked into.

36. It will be seen from the facts cited above in paragraphs 19-24 and 35 that the working of trains generally involved several breaches of rules and was done without due regard to safety. The tendency on construction is to push on with work and the staff is inclined to chafe at a too particular observance of rules and regulations, the practice goes on but it has the effect of more and more laxity being shown until the inevitable happens and a serious accident occurs and all concerned get a rude awakening. This accident is an apt illustration of the attendant dangers in not being particular about minor details and leaving too much to others who it is presumed will act up to their positions on the score of past experience ; it cannot be too strongly condemned and should be brought home to those responsible.

37. The absence of catch and slip sidings on this section (Theruvali-Titlagarh) with steep grades extending continuously for miles is typical of conditions generally on the Bengal Nagpur Railway and it is not surprising therefore that vehicles roll away from stations. From 1st January 1931 to 30th June 1931 there have been nine such accidents at Jharsuguda, Parlakimedi, Jonk, Sonder, Khargpur, Bhowra, Garpos, Chattikona and Kendposi ; the last two resulting in serious loss of life and property. It may be urged that in all cases the accidents were due to breach of rules, that is quite true, but safety sidings are intended to circumvent such breaches and their absence cannot be viewed with equanimity.

38. Footnotes (*b*) and (*c*) to Questions 56 and 57, Form IX, Rules for the opening of a Railway permit the use of steep grades close to stations and make the provision of safety sidings optional ; it is obvious the administration has taken advantage of these sections and done as little as possible, to keep down costs ; so long as this policy continues accidents must occur and the only remedy is to make the regulations more stringent.

39. My predecessors and I have stressed the importance of safety sidings, on new lines for years but in the absence of statutory regulations have had to be content with prescribing rules for the safe operation of trains. These are all right

as far as they go but they have their limitations and do not give the absolute security that safety sidings do ; this accident is an apt illustration of the result of the prevailing policy.

40. Frequent restrictions hamper operating work and if the loss due to engines and vehicles standing by is capitalised it will probably be found that the provision of safety sidings is more than financially justified apart from the security afforded, which is of paramount importance.

41. Catch sidings are of less importance if trains are run vacuumed throughout as in the event of a breakaway the vacuum brake automatically comes on and holds for about 30 minutes, ample time for a guard to pin down brakes and apply sprags. Moreover with the vacuum brake the danger of a train, approaching a station on a long steep grade, getting out of control is a remote contingency.

Slip sidings are a necessity as inspite of all prescribed rules breaches of them constantly occur and there is no other safeguard available. " Prevention is better than cure " is a maxim that merits more attention especially as a safety siding is a low-priced high-grade insurance.

Recommendations.

42. That one or other of the systems of Working prescribed in Chapter IV of the General Rules for Working Railways under Construction be strictly adhered to.

43. That where the system of working permitted under the ultimate part of General Rule 73 or General Rule 72 is introduced proper regulations shall be drawn up by the authorised officer.

44. That proper regulations be drawn up for control of shunting operations.

45. That each member of the staff be supplied with copies of all rules and regulations existing or drawn up for their guidance.

46. That qualified staff be employed for working of trains.

47. That proper train registers or line clear books be maintained.

48. That slip sidings be installed at each end of Chattikona yard owing to the steep grades falling away from the station.

49. That it be impressed on all concerned that it is just as important to display caution in the working of trains on constructions as elsewhere.

8. NORTH WESTERN RAILWAY.

DERAILMENT OF No. 83 UP PASSENGER TRAIN AT MILE 25/15-16 NEAR BAROG STATION (KALKA-SIMLA SECTION) ON THE 7TH JULY 1931.

FROM MR. J. SCRUBY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 31-T/31, DATED THE 28TH JULY 1931. (3928-T.)

In accordance with Rule 8 of Railway Board's Notification No. 1926-T., dated the 30th of July 1930, I beg to submit a report of the enquiry held by me into the circumstances attending the derailment of No. 83 Up Passenger Train, at mile 25/15-16 chains, near Barog Station on the Kalka-Simla Railway, on the 7th July 1931.

2. I visited the site of accident on the 7th, 8th and 13th of July and held a full enquiry at Barog and Kalka on the 8th and 9th of July.

3. The following officers attended the enquiry :—

Mr. H. F. Lockwood, Chief Operating Superintendent, North Western Railway.

Mr. F. R. Hawkes, Divisional Superintendent, North Western Railway, Delhi.

Mr. Ram Singh, Divisional Engineer, North Western Railway, Delhi.

Mr. V. L. Dean, Divisional Transportation Officer, North Western Railway, Delhi.

Mr. J. R. J. Pett, Assistant Rolling Stock Officer, North Western Railway, Delhi.

Mr. H. B. Powis, Sub-Divisional Officer, Railway Police, Delhi.

Attended part time on the 9th of July :—

Mr. E. B. N. Taylor, Deputy Chief Engineer, North Western Railway.

Mr. J. E. Ryall, Assistant Inspector General, Railway Police, Punjab, Lahore.

Description of the accident.

4. At about 10-30 hours on the 7th of July 1931, No. 83 Up Passenger Train (2′-6″ gauge) proceeding from Kalka to Simla and running twenty-six minutes late, was derailed on a curve at mile 25/15-16 chains between Kumarhatti (mile 24) and Barog (mile 26¼).

5. Composition of the train was as follows :—

Engine Class K, No. 21.

3rd class bogie coach No. 214.

3rd class bogie coach No. 211.

Intermediate class bogie coach No. 136.

1st and 2nd class composite bogie coach No. 70.

Luggage van bogie No. 525.

Postal and 3rd class bogie coach No. 436.

The train was vacuum braked throughout, except the engine, which is fitted with steam brake and hand brake. The load behind the engine was about 68 tons. Engine was 2-6-2 type with maximum axle load of 8·625 tons.

6. It would seem that the engine derailed first, and with two 3rd class and one intermediate class bogie coaches fell a distance of 100 feet down the "Khud". The downward course of the engine appears to have been partly arrested and deflected by an outcrop of rock which was struck. The position finally taken up was :—Engine canted over on its left side and to a right incline. First coach turned through a right angle and on its side. Second coach upright with one

end mounted on a rock outcrop. Third coach lying on its right side. The last three vehicles of the train remained on the railway formation ; the fore bogie of the front vehicle being derailed together with damaged brake gear, while the remaining two coaches kept the rails and were undamaged.

7. The casualties resulting from the accident are :—

Persons grievously injured, two of whom were regarded in serious condition	5
Persons who sustained minor injuries	17
TOTAL .	22

Out of this total of twenty two, seven were females. The engine crew received minor injuries.

The injured passengers were travelling in 3rd class and intermediate class compartments.

While deploring the casualties it is providential, in the circumstances, that they were not greater.

8. Assistance was readily and generously afforded to the injured. Experienced first aid was rendered at about 11-0 hours. Medical attention by a doctor was given at 11-45 hours. All casualties were cleared from the site by 12-30 hours.

9. Injured passengers were conveyed by rail and road motors. Ten persons were admitted to Dharampur Hospital, five miles away, six of whom have since been discharged. One person with minor injuries was attended to at the Patiala State Hospital at Kandaghat and discharged. Eight persons with minor cuts and bruises proceeded to their destination after medical attention. The driver and two firemen were admitted to North Western Railway Hospital, Kalka.

10. Uninjured passengers with their luggage were conveyed to Barog in three trips of an improvised train, finishing at 14-30 hours. A relief train from Barog completed the journey, arriving Simla at 19 hours, that is $5\frac{1}{4}$ hours late. The block on the section was removed at 16-35 hours.

11. The behaviour of the passengers was very good and the uninjured were willing to do what they could to help.

12. An approximate estimate of the damage to engine and rolling stock is Rs. 50,000, and to Way and Works Rs. 12.

The body work of the coaches, which is of steel, has withstood the accident wonderfully well ; had it been of wood it is feared that the casualties would have been greater.

Description of the locality of the accident and other factors.

13. The weather was clear and fine on the morning of the accident. Rainfall was recorded from a rain gauge at Dharampur at 8-0 hours on the following dates:—

July 5th	1·30 inches.
July 6th	1·12 inches.
July 7th	*Nil.*

14. The railway is on up gradient from Kalka to Kumarhatti after which there is down gradient to mile 28. Between Kumarhatti and Barog, $2\frac{1}{4}$ miles between stations, there is a fall of 160 feet and the alignment of the railway is a series of sharp curves along the hill side.

15. The train approaching the site of accident travelled down a long gradient of 1 in 43 around a curve turning left, 450 feet long, of 140 feet radius with actual radius of 135 feet for a distance of some eighty feet before and twenty feet past the point of derailment. The derailment took place about half way along this curve.

To the right of the direction of movement is the downward slope of the " Khud " and to the left the hill side rises steep above formation with a retaining wall, 11′-9″ high, 7′-0″ horizontal distance from the centre of track.

16. The design of the engine is such that a view of the track ahead can only be obtained by leaning outside the cab. Furthermore by reason of the curvature and the almost vertical retaining wall the visibility of the track at the site of accident is restricted to fifty feet or less.

17. Permanent way is of 60 lbs. F. F. rails on wooden sleepers. The inside rail of the curve is check railed. Ample broken stone ballast is provided. After the derailment the condition of the track was found to be satisfactory as regards to superelevation, gauge, clearance between running and check rails, even curvature, and running top. The track did not appear to have shifted immediately before or at the time of derailment. Apart from three broken sleepers, rails indented, and a few sleepers marked by wheels, as a result of the derailment, no other damage was done to the track. On the following morning a more detailed survey of the curve and permanent way was made. The results are plotted on the accompanying sketch and do not call for comment as contributory to the derailment.

Wear of the outside rail was not excessive there being $1\frac{7}{8}$" width of head on the table surface.

18. The first noticeable mark was on the inside running edge of the check rail at mile 26/1569 feet followed by a number of wheel indentation marks on the outer rail.

19. From the evidence, the position of the control levers in the engine cab after the accident is given as :—

Drivers handle (vacuum brake). In running position.

Steam Brake. Not released.

Hand Brake. Fully released.

Reversing lever. In fore gear.

Steam Regulator. Open small port.

20. Sanctioned maximum speed for passenger trains by day on the Kalka-Simla is 15 miles per hour.

21. The engine-driver had driven 343 goods trains and 111 passenger trains on the Kalka-Simla Railway. The journey on the 7th July was the seventh trip made by the guard of the train on the Kalka-Simla Railway.

Evidence.

22. Three written statements and the evidence of eighteen witnesses are recorded.

Conclusions.

23. The possible causes for the derailment which have been considered are enumerated :—

(i) Condition of engine.

(ii) Condition of rolling stock.

(iii) Defective brakes.

(iv) Defective permanent way.

(v) Obstruction on the track.

(vi) Excessive speed.

24. The engine was received from shops after overhauling on 24th January 1931 and its mileage since shopping is 9,600. The flanges of front bissel, leading, driving, back bissel, wheels on right hand side, were all in good condition.

25. Coaching vehicles were overhauled and lifted as shown below :—

Vehicle No.	Overhauled.	Lifted.
T 214	14-7-30	17-4-31
T 211	13-3-31	13-3-31
NT 136	14-8-30	2-1-31
FS 70	27-3-31	27-3-31
L 525	27-3-31	27-3-31
TPPHR 436	14-1-31	14-1-31

There is no indication of inherent defect in the vehicles.

26. There is evidence that the brake blocks on two of the coaches, some time after the accident, were found to be out of adjustment, and did not properly bind on application of the vacuum brake. This same composition of vehicles had however been brought by the same driver as a train from Simla to Kalka on the previous day without any apparent difficulty and without any report of defect by the driver and other staff in the Vacuum Register Book on arrival at Kalka.

The driver of 83 Up and engine crew state there was no trouble with brake power during the journey on 7th July. Deficiency in brake power would probably not be apparent from the footplate until after leaving Kumarhatti but would then be quickly experienced on the down grade. The evidence of the driver is that he was " holding " the train with the vacuum brake, and there is no suggestion of it being out of control, or recourse made to the steam brake or hand brake. I am therefore satisfied that the vacuum brake power on the train was sufficient.

27. The condition of the permanent way immediately after the accident was such as to give no reason for regarding it as contributory to the derailment.

28. The possibility of obstruction on the track has been given careful consideration. The driver in his first statement at the site of accident and in his further evidence attributes the cause of derailment to a " stone " on the track. He did not see the " stone " but says he received warning of it from the 1st fireman who was on the left hand side of the engine cab. The 1st fireman confirms this in his evidence.

In arriving at a conclusion on this matter the following circumstances have been taken into account :—

(i) The 1st fireman is very decided that the rock was of large size, about 4 cubic feet, that it was on the inside running and check rail, and not in the centre of track. In which case the cow-catcher of the engine would tend to thrust it or its debris towards the retaining wall on the hill side and not down the Khud.

(ii) After the derailment no rock or its debris was found on the track or formation, nor was there any obvious trace of a rock having been displaced from the hill side above.

(iii) In view of the comparatively heavy rainfall on the 5th to 6th of July and *nil* on the 7th July, it might reasonably be expected that any rock on the verge of falling would have fallen before the 7th July.

(iv) There was definitely no obstruction to the line at about 9-45 hours a which time No. 1 Up train passed the site of accident. A keyman testifies that No. 1 Up train passed him at the Kumarhatti entrance to Barog tunnel and he estimates that he passed the site of accident about half an hour later, at which time no stone or boulder was on the track.

(v) Had the driver received an emergency warning it is reasonable to suppose he would have made an emergency application of the brakes. The evidence of the position of control levers in the engine cab after the accident does not indicate any application of the brakes.

(vi) No evidence from the cow catcher of engine can be obtained as it has been damaged and doubled up from its fall down the " Khud ".

(vii) I experimented by dislodging stones from the hill side above the track and found that they fell in various positions, from between the retaining wall and track to the outside of formation ; those of large size, however, broke into smaller pieces before striking the formation or track.

I am unable to believe that there was any obstruction of the track to cause the derailment.

29. There is much direct and indirect evidence that the train was travelling fast, qualified by various expressions, prior to the derailment, but an approximate estimation in miles per hour could not be obtained at the enquiry. In arriving at

an opinion on this possible cause of the accident, the following features have been taken into consideration. :—

(i) The guard of the train states that he rang the communication bell, and " tapped " the guard's handle in the brake van, that is, admitted air gently into the train pipe which would tend to partly destroy the vacuum.

(ii) The 1st fireman admits hearing the communication bell ring in the engine cab. The driver and 2nd fireman say that they did not hear the bell ring, and the former says he did not notice any indication of the vacuum being destroyed.

(iii) The ringing of the communication bell in the engine cab according to the Kalka-Simla Railway General Instructions (now out of use) is an indication to the driver to take immediate measures to bring the train to a stand. I understand that this indication is still generally known to drivers.

(iv) In his statement after the accident, the guard estimated the speed of the train at 25 miles per hour, but he revised this to 18 miles per hour in his journal, written up later, and at the enquiry.

(v) The driver states that he did not exceed 13 miles per hour.

(vi) Evidence from two Sub-Inspectors of Railway Police, who are well acquainted with the Kalka-Simla Railway, is to the effect that the train was travelling unusually fast.

(vii) A permanent way gang mate in giving evidence said that the train was approaching at a very fast speed and that he ran to collect his hand signal flags. A keyman and permanent way cooly, also, testify to the train passing them at an unusually high speed.

(viii) Two witnesses on an adjacent hill who saw the course of the train and the accident considered the train was travelling at a high speed. They were, however, a long distance away, about $\frac{3}{4}$ mile, and it is doubtful if a correct estimation of relative speed could be expressed from this distance except by persons with highly trained faculties for speed.

30. I am of the opinion that the derailment of the train was due to excessive speed for which I am also of the opinion that the driver of the train is responsible.

31. I am unable to come to a conclusion at what speed the train was travelling prior to derailment, but am of opinion that it was considerably in excess of the sanctioned maximum speed of 15 miles per hour.

32. In my opinion the engine was first to derail and I do not consider that the front bogie of the fourth vehicle derailing on the inside of the curve has any bearing on the cause of the accident.

Recommendations and Observations.

33. Whatever may be the action taken against the Driver of the train, I recommend that he shall not be permitted to drive trains on a hill railway in the future.

34. The desirability is expressed of fitting speed recorders to engines of passenger trains on this railway, as also on other hill railways where similar conditions obtain, with a view to establishing all cases of excessive speed, giving the driver reliable information of the speed of train, and as a deterrent to exceeding the sanctioned maximum speed.

35. I recommend that North Western Railway Subsidiary Rule, Ghat Section, No. 9, shall be amplified to the effect that, drivers shall satisfy themselves that the brakes are operative throughout the train before leaving the starting station.

36. I am not satisfied that the testing of vacuum and brakes on trains at Kalka has invariably been carried out according to rules and instructions.

37. I recommend that the bell communication between guard and driver on passenger trains shall be tested by a definite application of the bell push in guard's van before each train leaves the starting station, in contra-distinction to making

the electric circuit by some extraneous means. This is a very important means of communication by reason of the restrictions to use of the vacuum handle by the guard, as laid down in North Western Railway Subsidiary Rules, Ghat Section.

38. It is observed that no use was made of the " first aid box " in the guard's van of the train, nor does it appear that the guard advertised its existence.

39. I visited Dharampur Hospital on the 13th July and was shown six of the injured passengers by the doctor in charge. They appeared to be properly attended.

40. I am informed that the following assistance was rendered :—

(i) First aid to the injured by Mrs. Cooper, Inspectress of Refreshment Rooms, North Western Railway, assisted by the Manager, Refreshment Room, Barog ; Signaller, Barog ; and other railway staff.

(ii) Medical attendance by Lieut. Hennessey, R. A. M. C., assisted by four orderlies from Dagshai.

(iii) Assistance with transport and facilities in State Hospitals by H. H. the Maharaja of Patiala who personally visited the site of accident.

(iv) Lieut. N. W. Keane with 20 British other ranks of the East Surrey Regiment as a stretcher bearing party.

(v) Raja Sahib of Bhagat State sent his ambulance car with a doctor and party of boy scouts.

9. EASTERN BENGAL RAILWAY.

COLLISION BETWEEN 13 UP AND 15 UP BROAD GAUGE PASSENGER TRAINS AT SANTAHAR STATION ON THE 16TH AUGUST 1931.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 717, DATED THE 25TH SEPTEMBER 1931. (4030-T.)

1. In accordance with Rules 7 and 8 of Notification No. 1926-T., dated 19th March 1930, I submit below my report on an enquiry into a collision that occurred at Santahar station on the Eastern Bengal Railway on the 16th August 1931 between 13 Up and 15 Up Broad Gauge Passenger trains.

2. The basis of this report is the District Officers' Joint Enquiry held at Santahar on the 21st August 1931, which was also attended by Superintendent, Railway Police, Calcutta, Sub-District Magistrate, Joypurhat (Bogra), Inspector of Police, Santahar (Bogra). The papers of this enquiry I scrutinized when I went down to Santahar on the morning of the 22nd August 1931, before making a personal investigation on the spot. It was from the statement of damages accompanying these papers that I became aware of the inclusion of this accident in the category of accidents on which a report is required by a Government Inspector.

3. This enquiry was carefully conducted and I have adopted without supplement the recorded statements of witnesses examined by the committee and have added as evidence only the preliminary report, on the accident, of the Assistant Traffic Superintendent, Santahar, for the portion wherein he tells of his testing of the interlocking immediately after his examination of witnesses.

Description of the accident.

4. At about 4-14 hours on the 16th August 1931, No. 13 Up Passenger Train, composed of nine bogie passenger coaches only, and standing on line No. 1 in Santahar Station yard, was run into from behind by No. 15 Up Express Passenger Train, composed of XB type Engine No. 447, nine bogie passenger coaches and three four wheelers. The last coach of 13 Up, a bogie I and II composite, No. 1335, built at Dum Dum and Kanchrapara in 1928, which had been detached from the remaining 8 coaches, was badly damaged. Damage was sustained by Engine XB 447, and 12 persons suffered scratches and bruises. No. 15 Up parted between the 3rd and 4th vehicles from the Engine. Nobody was killed or seriously injured.

Description of the locality.

5. Santahar Junction is a station at mile 173½ on the Single line portion of the Main Broad Gauge Line of the Eastern Bengal Railway from Calcutta to Siliguri.

No Broad Gauge line other than the Main Line enters the yard, but the Metre Gauge line *viâ* Bogra and Bonarpara to Kaunia (with all its tracks inside and outside the yard entirely separate from the Broad Gauge tracks) takes off here ; thus Santahar remains a " Junction " (which it strictly was before the Main Line was converted from Metre to Broad Gauge) while in effect a Crossing Station for Broad Gauge and a Terminal Station for Metre Gauge Trains.

The accident is not connected in any way with the Metre Gauge portion of the yard and all reference hereafter is confined to the Broad Gauge portion of the yard alone.

The yard is signalled and interlocked and is worked as a " B " class station ; the conditions under which permission to approach may be given are specified in General Rule No. 254.

NOTE.—The Goods Cabin is worked as an " A " class station in the *down* direction, but the accident is uncons cerned with the down direction.

There are three Santahar Cabins, *viz.*, Santahar Goods Cabin (Mile 172¼) South Cabin and North Cabin. The last two are South and North respectively

of Santahar Station Building (Mile 173½). The first station below Santahar is Raninagar (Mile 169), the first station above Santahar is Tilakpur (Mile 178½).

The Goods Cabin is worked as an independent Block Hut and is manned by three Cabin Assistants and three switchmen; the South and North Cabins each have three switchmen only.

Neal's Token Instruments connect Raninagar with Santahar Goods Cabin, Santahar Goods Cabin with Santahar Station Master's office, and Santahar Station Master's office with Tilakpur. Connections between Station Master's office and North and South Cabins are by Telephones.

Looking in the "Up" direction Santahar Goods cabin is on the right of the line, South Cabin on the left and North Cabin on the right. There is a slight curve to the right between the Goods Cabin and South Cabin.

In the Passenger Yard there are five tracks, referred to in the Station and Cabin Diagrams as Lines Numbers 1, 2, 3, 4 and 5. Looking "Up" the tracks are all to the left of the Station Building, the farthest, No. 1, the nearest, No. 5.

No. 1 line is for reception of Up passenger trains, No. 2 for Down passenger trains, No. 3 is a non-reception siding, No. 4 receives Up or Down goods trains and No. 5 Up or Down Express trains. Nos. 1 to 4 are on turn-outs, No. 5 on the straight, but at the down end No. 4 is on the straight and No. 5 is on the turn-out.

The "Up" Home signals are carried on a bracket post about 400 feet south of the South Cabin and about 260 feet south of the outermost facing points. Signal arms Nos. 2 and 3, serving respectively Roads (or lines) Nos. 1 and 5, are carried on dolls of unequal height, the taller serving Road No. 5. The Goods Signal No. 4 to Road No. 4 is carried on the post below the brackets. These signals are operated from the South Cabin, but are slotted by the North Cabin and electrically controlled by the Station Master's switch in the station building. The giving of a slot for a signal is indicated in the Cabin by the "Off" position of the miniature semaphore arm of the electric slot indicator pertaining to that signal. The rules require that no attempt should be made to lower a slotted signal until the miniature semaphore arm of its indicator in the cabin has dropped.

The Starter Signal No. 5 of Goods Cabin, Santahar, is placed at a distance of 1,800 feet south of the above Home signals and as it is slotted by the South Cabin and cannot be lowered until one of the Home Signals has been lowered it does duty as an Outer Signal, and the Warner Signal is carried on the same post, below it. As all trains must stop at Santahar the Warner signal is fixed at danger.

Evidence.

6. Driver King says he drove 13 Up into Santahar at 3-38 hours on 16th August 1931. His train was received on No. 1 line as usual. He cut off the Engine and took it under proper authority to the North Water Column on Line No. 4. After watering he took his Engine for shunting work down Line No. 4 to the Down Starting Signal where he was told to wait till 15 Up came in.

NOTE.—The significance of the above evidence is in what could have been the positions of the slots and signals during these movements. There is every reason to believe that 13 Up came in on proper signals, therefore Signal No. 2 must have been lowered by South Cabin after the slot had been given by the pulling of lever No. 40 in the North Cabin. According to the interlocking, which under test was found to be in good order, before lever No. 40 could be pulled lever No. 24 operating, points No. 24 (which connects No. 1 line at its trailing end with No. 4 line) had to be pulled, and before the engine of 13 Up could be backed on to No. 4 line, lever No. 24 had to be put back; but this could not be done until lever No. 40 had been pulled and thus released the slot on Up Home Signal No. 2.

7. Driver Gibbs drove Engine No. 447 XB hauling 15 Up on 16th August 1931. After passing Santahar Goods Cabin he saw the "Outer" and Loop Home Signals lowered, but when he was coming into the straight after taking the turn-out he saw a train on the same line some 40 yards ahead of him and made every effort to stop. It is unusual for 15 Up to be received on No. 1 Line but it is done sometimes. His train was 26 minutes late.

8. Mr. Wilson, a resident of Santahar for 6½ years and an Inspector in the Burmah Oil Company, said he came to the Station to meet friends due by 15 Up. He saw 13 Up arrive when he was nearing the South Cabin and up to the time that he got to the Station to enquire (at 4-4 hours) about 15 Up the signals given for 13 Up remained lowered. Shortly afterwards, when the headlights of 15 Up warned him of the approach of this train, he saw 15 Up take the turn-out for No. 1 line and noticed that the signals were the same as those lowered for 13 Up.

9. Switchman, Motilal Biswas, of South Cabin, said that after the arrival of 13 Up he returned the signal arms to danger but left the facing points set for No. 1 line. He received no information from the Assistant Station Master about the coming of 15 Up and was surprised to find it approaching his Cabin. He did not lower any signals for 15 Up, which came in against signals. He said also that he did not give the slot for Goods Cabin Starter No. 5 as he himself had not received a slot for a Home Signal from the Station.

10. Switchman, Bishnu Nath Sircar, of North Cabin, said that at 4-5 hours the Assistant Station Master told him to give the slot for line No. 5 for admission of 15 Up. At 4-14 hours he heard 15 Up collide with 13 Up on Line No. 1.

11. Assistant Station Master D. N. Ghosal, stated that he came on duty at 2 hours and admitted 13 Up on Line No. 1 at 3-43 hours. The Engine was cut off and sent to Line No. 4 for shunting on the end of 15 Up. After this he asked the Switchman North Cabin to give South Cabin the slot for Line No. 5 for the admission of 15 Up and instructed the Switchman of South Cabin to lower Signals for Line No. 5. Then the collision occurred and he sent for the Station Master and the Medical Officer and asked another Assistant Station Master to assist him because his " mind was puzzled."

12. He had been Assistant Station Master at Santahar for two months. He did not personally see the signals lowered for 15 Up. After he had given orders for the Engine of 13 Up to go to Line No. 4 he came out of his office (at about 4 hours) to see if this had been done. At this time all the signals were at danger. Recalled, he said that he put his switch, which had been set for Line No. 1, back to normal at about 3-45 hours, that he told the Switchman North Cabin to give the slot for No. 5 Line at 4-4 hours and gave the switch to South Cabin at 4-5 hours.

13. Assistant Station Master B. Ganguly was on duty in the Goods Cabin from 2 to 10 hours on 16th August 1931. He received the slot for 13 Up from the South Cabin at about 3-31 hours and the slot was put back by South Cabin about 7 or 8 minutes after 13 Up had passed his cabin. He asked for Line Clear for 15 Up at 3-46 hours and received it at once. Ten minutes later he asked for the switch, received it at 4-5 hours and then lowered his Starter and Warner Signals. 15 Up passed his Cabin at 4-10 hours.

14. Mr. C. V. Jacob, Traffic Inspector, stated that on 17th August 1931 he tested the interlocking for the reception of an Up train on No. 1 Line and found it in working order. On the night of the 20th he made similar tests for both Up and Down directions, two in the Up and three in the Down direction. In the Down directions signals were lowered for the reception of a train on No. 5 Line ; when South Cabin put back his slot the down Home Signal for No. 5 Line did not go back to " On". The manipulation of the Station Master's switch did not bring it back to " On," but on the Signal Lever in the North Cabin being thrown back the Signal returned to " On."

15. Mr. Bancroft, Assistant Traffic Superintendent, Santahar, in a written statement stated that he tested the signals on the 16th August and found that the Home Loop Signal remained in the " Off " position instead of going back to the danger position when the switch in the Assistant Station Master's office was released.

Conclusions.

16. The District Officers' Joint Enquiry Committee found that the disregard by Assistant Station Master Babu D. N. Ghosal of General Rules, 254 (*b*), 37 (i), (ii), (iii), and 37 (*e*) was the primary cause of the accident. They hold Switchman Motilal Biswas equally blameworthy in that he did not throw his Signal and slot levers back to normal after the arrival of 13 Up. Both men are being prosecuted under Section 101 of the Railway Act.

17. I agree with the finding.

18. There is no reason to believe that Driver Gibbs ran against Signals. According to Driver Gibbs' statement and the statements of his fireman and Mr. Wilson of the Burmah Oil Company, Signals were lowered for Line No. 1. Confirmation of this comes from the Assistant Station Master of Santahar Goods Cabin B. Ganguly, who said that he lowered his Starter and Warner to admit 15 Up. He could not have lowered his Starter unless the slot from the South

Cabin had either been left on or given again and this slot could not have been left on or given again by South Cabin unless one of the Home Signals, 2, 3 or 4 was "Off". Since the points were set for Line No. 1 the only Home Signal that could have been "Off" is No. 2 and the most reasonable conclusion that can be come to is that the Signals lowered for 13 Up had not been put back to danger when 15 Up came in about half an hour later.

19. To allow of the movement to Line No. 4 of the Engine of 13 Up the Switchman of the North Cabin must have put back his slot Lever No. 40. This action should have put back South Cabin Home Signal No. 2 for Line No. 1 to danger, but subsequent tests showed that failure was possible. Accepting the evidence that Signals were lowered the conclusion is that on the occasion of the accident under enquiry the Home Signal No. 2 failed to go back to danger when the slot was released by North Cabin.

Remarks and Recommendations.

20. The failure of the Signal arms at Santahar to go back to danger, when their slots were released, is, the Signal Engineer, Eastern Bengal Railway, informs me, due to the arms being of an old type which sometimes stick in rainy weather by reason of an insufficient turning moment. The arms at Santahar were actually down for replacement this year and were under manufacture. The replacement of arms of this type throughout the line is being carried out as a Revenue charge and only a small amount of money is available annually so that only a comparatively small amount of replacement can be undertaken. There is more than an element of danger in this and the result of an accident is liable to be far more costly than the replacement of many scores of arms. The Eastern Bengal Railway Administration might be asked to adopt an accelerated programme of renewal.

10. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

ACCIDENT TO DOWN SPECIAL GOODS TRAIN AT MILE 41/13 (ANAND-GODHRA SECTION) AT ABOUT 21-30 HOURS ON THE 23RD AUGUST 1931.

FROM MR. H. LAWTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1530, DATED THE 7TH SEPTEMBER 1931. (3993-T.)

Proceedings of an Enquiry held at Godhra on 26th (with inspection at site on 25th and 27th) August 1931 by the Senior Government Inspector of Railways, Circle No. 5, Bombay, under section 7 of Railway Department Notification No. 1926-T, dated 19th March 1930, to enquire into the accident to Down Special Goods Train at mile 41/13 Anand-Godhra Section, B. B. & C. I. Railway (Broad Gauge System), at about 21-30 hours on 23rd August 1931.

PRESENT.

Mr. Manganlal Madhubai Mehta, B.A., 1st class Magistrate, Godhra Taluka.

* Mr. H. P. Jones, Chief Engineer, B. B. & C. I. Railway.

* Mr. A. N. Fairbourne, Executive Engineer, Ahmedabad.

Mr. S. G. Pick, District Traffic Supdt., Rutlam.

Mr. G. Williams, District Locomotive Supdt., Ahmedabad, and

Mr. H. Lawton, Senior Government Inspector of Railways, Circle No. 5, Bombay.

Description of Accident.

1. On the afternoon and evening of 23rd August 1931 there was very heavy rain to the west of Godhra which caused the water level in the nallas crossed by the Godhra-Anand Line to rise suddenly very high ; the peak seems to have been about 21 to 21-30 hours ; after that the water level subsided nearly as rapidly.

2. From Godhra (mile 49) the block stations are Tuwa (mile 40), Timba Road (mile 34½), Sevalia (mile 32), etc.

3. At 18-0 hours an Up Goods Train, mostly loaded coal, with engine No. 150 G (type 2-8-0, tender, electric headlight) left Godhra for Ahmedabad *viâ* Anand, but was unable to proceed beyond Timba Road as the water level at the Mahi Bridge between Timba Road and Sevalia had risen above the permissible level for traffic. The engine was then reversed and the train started back to Godhra as a Down Special Goods Train the engine running tender foremost, departure from Timba Road 19-50 hours.

4. On the way from Timba Road to Tuwa the driver noticed the line over-flooded between miles 38 and 39, and he was piloted over 2×20′ girder bridge No. 71 at mile 38/13 by a gangman who went on with him on the foot-plate into Tuwa Station, arrival 21-0 hours.

5. At Tuwa station the line clear tablet was sent to the facing points for the driver to run through (Tuwa signals are single arm homes and outers only) but the driver stopped at the usual place, went back to speak to the Guard, then went to the station office and issued a memo for advising the Permanent Way Staff about the overflooding at mile 38-39, and then went back to the engine. The gang-mate and 3 gang-men of that section also got on to the engine there, so that on leaving Tuwa there were on the engine the driver, 1st and 2nd firemen, gang-mate and 3 gang-men, making 7 in all.

6. The Down Special Goods Train left Tuwa at 21-15 hours and after proceeding about 1½ miles the engine fell into 1×22′ girder bridge No. 78 at mile 41/13 (known locally as Bochad Nala) which was running very full at the time, and all on the engine were killed with the exception of the 2nd fireman who had a miraculous escape and was found downstream next morning clinging to a tree badly burnt and bruised and his back hurt. Seven four-wheeled goods vehicles behind

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* Part of the time present alternately.

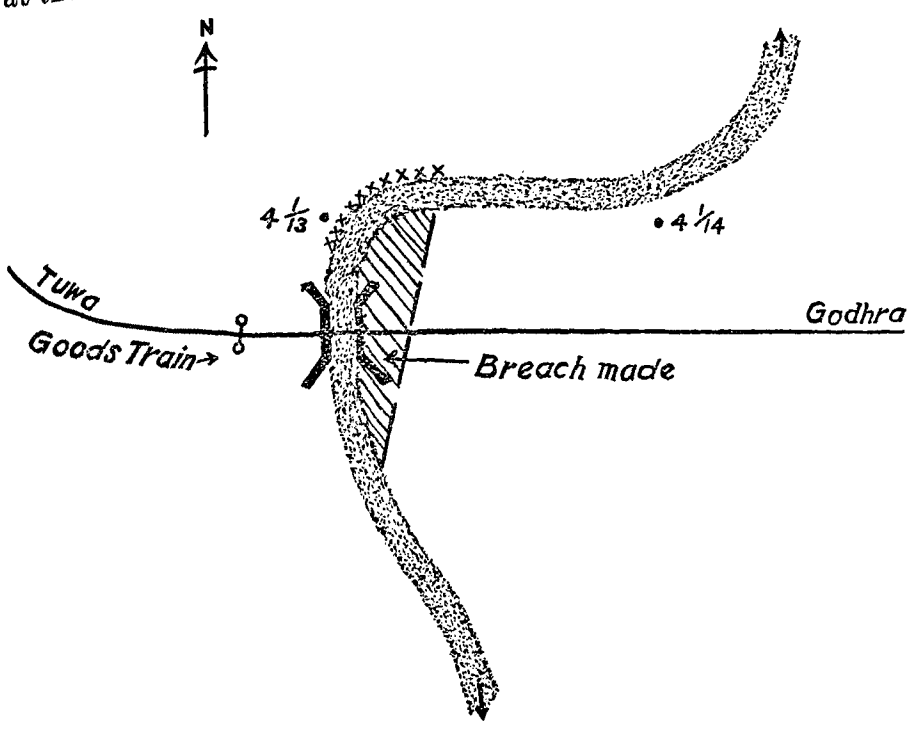
the engine also fell into the bridge. This train had vacuum brake coupled up throughout.

7. At the time of the accident it was very dark and raining heavily.

8. The line-guard's beat including culvert No. 78 is from mile 41/18 on Godhra side of Tuwa to mile 38 on Timba Road side of Tuwa. On the night of the accident the line-guard, coming from Timba Road side, got his ticket signed at Tuwa at 20-30 hours, and then went towards Godhra to the end of his beat where the next beat line-guard then exchanged tickets with him, and he returned to Tuwa getting his ticket signed at 21-35 hours. The line-guard thus crossed culvert No. 78, which is near the end of his beat twice at about 21 hours, and he states that on both occasions the water level was about 2 feet below the bottom of the girders and he saw both abutments and no crack was noticed; he also states that the Down Special Goods Train passed him near the outer signal (corroborated by the guard of that train) which is about a mile from culvert No. 78 so that the line-guard had passed over that culvert not more than half an hour before the accident happened.

Description of Locality of Accident.

9. The line runs east and west. Bridge No. 78 at mile 41/13 lies on the straight at the end of a curve, it is $1 \times 22'$ girder, brickwork abutments and splayed straight wing-walls. The nala flows south to north, with a slightly skew approach and a rightangled bend below the bridge held in by soft rock bank. Normal low water level is about 20′ below rail level with about 6″ depth of water. The line-guard who has known the nala for about 20 years indicates a previous high flood level about 12′ below rail level, as compared with flood level on night of accident about 6′ below rail level. Track on the bridge is 82 lb. bull-headed rails in cast iron chairs on substantial teak bridge sleepers each having 2 "clip" holding down bolts on the inside of flanges.



10. (i) The railway alignment here follows an old road which had a 22′ arch culvert at this nala, road level probably being about 5′ below present formation level, the abutments were raised and girders put in, and the wing-walls were also raised to formation level. In 1923 the top of the abutments was rebuilt down to old springing level the new brickwork being clearly visible on the old; the arch has been dismantled, probably at that time.

(ii) The girder abutment and wing walls were thus somewhat thin for their height, the abutment being 3′10″ and 7′ thick at base of new and old masonry, 9′ and 19′ below formation level respectively, and the wing walls being about 3′-9″ thick at base of old masonry 19′ below formation level.

11. After the flood subsided the west abutment and wing-walls were standing but the former had a huge portion knocked out of it at the southern end while the south bed-stone was washed out and found 10′ down stream of the abutment, there were further some big cracks. The east abutment was levelled off at 18′ below rail level, the south wing-wall at 20′ below rail level, and the north wing-wall from 22′ at the inner to 24′ at the outer end below rail level; the foundations

seemed quite sound. There was a breach 70′ wide at the top behind the east abutment through which the stream had flowed when the bridge was blocked by the engine and wagons. The girders were lying straight below the bridge about 40′ from the centre-line, one girder was visible above water and apparently undamaged with 4 bridge sleepers still attached to it. The tender was lying across the centre of the base of the east-north wing-wall more or less as it had been running and the engine had thrown a somersault and was lying on its side on the tender, wheels towards track; the first 3 trucks were piled one on the other between the engine and the abutment, and next 4 trucks and wagons were piled up in the bridge opening.

12. Masses of brickwork were carried about 200′ down stream, and a further 100′ down stream the bed of the nala was strewn with single bricks. At the site of the bridge the bed is scoured out about 4′.

List of persons killed and injured.

13. *Killed.*

1 Driver D'Mello.
2 1st Fireman Abdul Rahiman.
3 Gangmate Kabhai Bhawa.
4 Gangman Kara Bana.
5 ,, Dhura Kalya.
6 ,, Chawa Bacher.

Injured.

7 2nd Fireman Moosa Omer Sikari, seriously injured.

Damage done.

14. *Track and Formation—*

About 90′ track destroyed.
1×22′ girder bridge destroyed.
70′ breach in bank at back of east abutment.
Rolling Stock—
G class engine (type 2-8-0, tender) wrecked and more or less scrap.
7 goods four-wheelers wrecked and more or less scrap.
Some loads in the wrecked goods vehicles washed away, mostly coal.

15. A diversion will have to be constructed which will take a fortnight.

16. I should say the total damage, diversion, etc., will come to between Rs. 2 lakhs and Rs. 3 lakhs.

Detail statement of evidence taken.

17. *On 26th August 1931.*

1. Mr. Jalejar Dinshaw Hodiwala—Guard of the Down Special Goods Train.
2. Bhadar Sada—Night line-guard, mile 38-41/18.
3. Raiji Bhola—Night line-guard, mile 41/18-45/8.
4. Mr. Lalbhai Purshotam—Deputy Station Master, Tuwa Station.
5. Mangal Kuber—Gangman, No. 13 gang (mile 36-39).
6. Moosa Omer Sikari—2nd Fireman of the Down Special Goods train.
7. Mr. Vasanji Naranji—Sub-Permanent Way Inspector, Godhra.

On 27th August 1931.

8. Bhula Mawa. Pointsman, Tuwa Station.
9. Kaja Vaja. Gangman, No. 14 gang (mile 39-42).
10. Kabhai Mathur. Gangman, No. 14 gang (mile 39-42).

Conclusions.

18. The line-guards were out on their beats prior to the accident, they were patrolling carefully, and the meeting at mile 41/18 at about 21 hours was to schedule. The line-tickets that evening were correctly filled in and signed at Tuwa.

19. The gang-mate was present that evening at the gang-chawl at Tuwa with 6 gang-men with the intention of looking to the line on each side, presumably after the evening meal. The mate himself seems to have visited the Timba Road side whilst the meal was being prepared, and on his return after the meal he sent 3 gang-men that side to see the Khari Bridge about half a mile out, presumably himself intending to visit the Godhra side with 3 gang-men. At that time the Down Special Goods Train was at Tuwa Station, and the mate seems to have told the driver that he would accompany the train, and he with 3 gang-men then got on to the foot-plate. It is not clear what the mate's intention was in getting on to the foot-plate but some sort of a look-out seems to have been kept, I doubt however if anyone got up on to the middle of the tender. The night was dark and it was raining heavily and I doubt if those looking out could see anything of the line.

20. The Driver of the Train seems to have been running slowly and carefully on the return, tender foremost, from Timba Road towards Godhra. Presumably he was satisfied that the gang-mate's and gang-men's presence on the foot-plate was reasonable in the circumstances.

21. At 2×20′ girder bridge No. 71 mile 38/13 the central pier was scoured clean out shortly after the Down Special Goods Train had crossed it on its return from Timba Road to Tuwa, and the bank behind the abutments of bridge No. 67 near Timba Road outer signal was also scoured out. The suddenness of the damage generally at 21-30 hours is a very marked feature, and I do not think that anyone on the spot, either line-guard or gang-mate, realized what was developing.

22. (*a*) As regards what actually happened at Bridge No. 78* it is I think most difficult if not impossible to arrive at an undoubted solution.

(*b*) There is a rail joint 6′ behind the face of the west abutment, and the next joint must have been 8′ behind the face of the east abutment.

(*c*) The girders had 12 stout teak sleepers. There are 4 sleepers still attached to the girders and there are 3 lying on the east bank ; none shew signs of derailment, or are knocked about. On the east bank there is also a complete half bridge sleeper with chair and " clip " holding down bolt in place, the other half being smashed off.

(*d*) The " back " of the tender, *i.e.*, the end leading when running tender foremost has had its wheel guards both equally bent upwards and inwards, with marking as if they had both slid along rails at normal gauge ; also the " back " near the top has struck and been impaled on two square rail ends more or less vertically above the wheels ; which seems to indicate that as the tender approached the bridge the track was more or less straight, and that as it ran across the bridge there was no support for the track which bent under the tender until the joints behind the abutments gave way, thus letting the tender fall as it moved forwards till it impaled itself a foot or two on the broken rail joint at the back of the east abutment, where it stopped, and the current just washed it down a broken abutment and wing-wall to the position in which it was found.

(*e*) From there being 4 sleepers still attached by " clip " holding down bolts to the girders after the accident, some of which had the chairs still spiked to them and others had spike holes straight without side tear, it seems that the girders fell from the rails in some way or were stripped from them when they bent under the weight of the tender, and were not swept sideways off the abutments by a tree or wave.

(*f*) The base of the east abutment after the accident seemed solid and free from settlement and also free from scour except possibly the northern-most, *i.e.*, downstream end ; but the mortar was friable and there were many small roots in it, also there did not seem to be much bonding.

(*g*) The west abutment on being dismantled showed a diagonal crack along the back of the old arch abutment from near its top (say at 10′ below formation

* One span consisting of two girders, langth 25′ over all and 22′ between bed-plates.

level) downwards towards the toe, and a vertical crack 18", *i.e.*, two brick-lengths in from the face along the lower half, the diagonal crack did not appear to have been recent. I should say that the " vertical " crack was the outcome of the " diagonal " crack.

NOTE.—In the photograph of the accident taken from down-stream, at the end of the west abutment the " vertical " crack is visible at the base 2 brick-lengths in up to 11 courses above water level, also a short " diagonal " crack is visible at the back rather less than half way up which however may be a little higher than the general level of the " diagonal " crack in the centre of the abutment. Both these cracks have I think been opened up by blows on the abutment in the course of the accident. I do not think that they would have been visible before the accident.

(*h*) The face of the east abutment base after the accident was just such as a " vertical " crack similar to the west abutment would have left ; and my impression is that the east abutment did have within it a " vertical " crack similar to the west abutment and presumably therefore also had some " diagonal " crack similar to the west abutment (due possibly to earth pressure at back of abutment at monsoon time with heavy engines running coupled with thinnish and inferior base masonry) and that suddenly just before or just as the engine reached the bridge, the flood then being more or less at its highest and fiercest, the strip of masonry in front of the " vertical " crack went followed by the top portion of the abutment slipping down the " diagonal " crack.

Exactly what could have led to this strip of masonry going I am unable to say, but I think it is possible that there was scour followed by a slip at the down-stream wing-wall which either by itself or by development into a breach might have caused some variation in pressure which the upper portion of the abutment could not withstand.

Recommendations.

23. This accident is a peculiar one, and general recommendations are difficult ; I think consideration should be given to the recording of high flood levels on bridges as a regular practice, and to line-guards being acquainted with normal high flood level, and to line-guards being required to report with a view to special precautions all cases of exceptional high flood particularly at bridges where the masonry is appreciably thinner than recent standard practice especially if the abutments lean at all forward. No train should be permitted to cross in such cases whilst an exceptional high flood continues until and unless those precautions have been taken. What constitutes an exceptional high flood is a matter for local settlement, in the present case high flood level seems to have been about 6 ft. above what it had been before.

11. SOUTH INDIAN RAILWAY.

DERAILMENT OF No. 6 DOWN EXPRESS (TRIVANDRUM TO MADRAS) AT VRIDDHACHALAM ABOUT 2 HOURS ON THE 1ST SEPTEMBER 1931.

FROM MR. A. E. B. SULLEN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, MADRAS, TO THE SECRETARY, RAILWAY BOARD, LETTER No. S.-31/500, DATED THE 7TH DECEMBER 1931. (3987-T.).

As desired in your letter No. 3987-T., dated 30th October 1931, I have the honour to submit a report on the above accident. The enquiry was held at Vriddhachalam on the 4th September 1931 by the Sub-Divisional Magistrate, Chidambaram, and was attended by me.

Description of the accident.

2. At about 2 hours on the 1st September No. 6 Down Express from Trivandrum to Madras was derailed at points No. 5 at the Madras end of Vriddhachalam station resulting in the capsizing of Engine YB 11 and telescoping of a F.S. T.-13 (Bogie 1st, 2nd and 3rd).

3. *Casualties.*—Three railway employees and two third class passengers were injured. First aid was rendered by a doctor who was travelling in the train and by the Medical Officer of the Danish Mission Hospital close to the station. The injured were then removed to the Government Hospital.

4. A relief train was despatched from Villupuram into which No. 6 was transhipped.

5. Vriddhachalam is a non-interlocked station on the Metre Gauge section of the South Indian Railway, 135 miles from Madras. The yard is on the level, the night was clear.

Conclusion.

6. The accident was due to facing points No. 8 not being set and locked in their normal position after the reception of No. 228 Down Passenger on the 31st August 1931.

7. No. 5 Up Express (Madras—Trivandrum) apparently trailed through these points leaving them split and when No. 6 Down Express negotiated the same, the engine bogie wheels took the main line, the driving wheels however appear to have closed the switch rail and taken the turn-out, hauling the bogie wheels in the same direction. The bogie wheels travelled over the sleepers shearing the fish bolts and displacing the left hand stock rail of points No. 5 resulting in the engine wheels being buried in the sand ballast and the capsizing of the engine with consequent damage to the first bogie carriage.

8. Instructions for working this station cover almost every conceivable contingency, but they were of no use. Facing points No. 8 could not have been manned. The Rules for the responsibility for the correct setting of points on the Head Pointsman who does not, according to the evidence, appear to have been on the spot.

Recommendations.

9. Cross over 5—8 to be rod-coupled. Points No. 8 to be fitted with a disc indicator.

10. The interlocking of this station to be taken up when financial conditions permit.

12. EASTERN BENGAL RAILWAY.

COLLISION BETWEEN No. 7 UP DACCA MAIL AND A SHUNTING TRAIN NEAR RAJBARI ON THE 9TH SEPTEMBER 1931.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 761, DATED THE 12TH OCTOBER 1931. (3997-T.).

As required under paragraphs 7 and 8 of Notification No. 1926-T., dated 19th March 1930, I submit below a report on the circumstances attending a collision that occurred near Rajbari on the 9th September 1931 between 7 Up Dacca Mail and a shunting train.

2. On the day of the accident statements of witnesses were recorded on the spot by officers of the Eastern Bengal Railway. These statements were confirmed and added to at a District Officers' Joint Enquiry held at Rajbari on the 15th September. On the 20th September I inspected the site and examined witnesses at Rajbari.

Description of the accident.

3. At about 4-12 hours on the 9th September 1931, 7 Up Dacca Mail, composed of M. S. Type Engine No. 59 and 12 bogie coaches collided with Rajbari Yard Pilot Engine, No. 133 G, with 8 goods wagons (7 loaded and 1 empty) attached, at mile 144¼, near Rajbari. The engines were badly damaged one bogie luggage van (No. 2197) just behind the Engine on the Mail train was telescoped and three covered goods wagons, *viz.*, Nos. N. W. 33777, G. I. P. 3555 and E. I. 30895 were derailed. Of these the first two capsized. There were no persons killed, but the driver of the shunting engine received head and other injuries, and a railway saloon bearer, scalds sufficiently serious to require their removal to and detention in hospital. Four other railway employés and seven passengers were treated on the spot for minor injuries.

Description of the Locality.

4. Rajbari is an interlocked B Class station, on the Eastern Bengal Railway, 146 miles from Calcutta. It is on the Goalundo Branch Line over which the Chittagong and Dacca Mails run, from (and to) Poradaha (mile 103). Traffic is "Up" to Goalundo, "Down" to Poradaha. In the "Up" direction the line clear station immediately before Rajbari is Belgachi (mile 139¼) and after Rajbari is Dadsi (mile 147½). There is a flag station, Surjanagar, at mile 142¾ between Belgachi and Rajbari. Trains are worked under the Absolute Block system with Neale's Token Instruments.

5. The line runs from west to east and is straight and generally level from at least a mile before the point of collision to the Down Home signal at the far end of Rajbari Station Yard, that is for a distance of at least three miles.

6. Rajbari Yard was fitted in June 1931 with advanced starting signals, one at each end of the Yard, interlocked with the Neale's Token Instruments in such a manner that neither advanced starter can be lowered until line clear in its direction by means of a token has been given.

Evidence.

7. The evidence is clear that on the 9th September 1931 shunting was being carried out at the Belgachi end of Rajbari Yard under the authority of the Assistant Station Master on duty, Babu B. B. Lahiri, after line clear had been given for 7 Up Dacca Mail train to approach from Belgachi. Babu B. B. Lahiri states that he gave permission for this shunting some little time before giving line clear, and that there was delay in shunting being commenced, but that he did not stop the shunting before giving Line Clear. He maintains that under General Rule 255 he is entitled to shunt up to an advanced starting signal after permission to approach has been given to a train, provided signals are kept at danger, against

the train. He stated that this method of working was usual at Rajbari station since the installation of advanced starting signals some three months previous; but this statement is denied in the evidence of the Station Master and two other Assistant Station Masters examined, who agree that shunting in the face of an approaching train is not permissible. Babu B. B. Lahiri has missed the significance of Subsidiary Rule 255 (*a*) which has the effect of cancelling (*c*) (*i*) of the conditions, under which permission to approach may be given, that are specified in General Rule 254, and of requiring the line to be clear to the Home Signal.

8. The evidence is clear also that the driver of the shunting engine, Radhakissen, had no authority whatsoever for going past the advanced starting signal. But he went a long way past this signal, and a mile and quarter farther than he needed to go to clear the points for shunting from No. 2 line to No. 3 line. He states in his last statement (to me) that after his fireman got off, with his permission, he fired the engine and during the firing the other men who had been on his engine, *viz.*, the Gunner and a Shunting porter must have got off. He said it requires 3 or 4 minutes to fire the engine. But the point of collision was nearly a mile and a half from the facing points that he was required to clear and at 10 miles per hour he would have been 9 minutes on this run. His statement that he was firing all the time cannot be accepted and the only conclusion that appears reasonable is that driver Radhakissen was both alone on his engine and asleep when he went past the advanced starting signal towards Belgachi on the 9th September 1931.

Conclusion.

9. The accident was due to Radhakissen, driver of Rajbari Yard Pilot Engine, leaving Rajbari Yard in the Down direction without authority.

10. The Up Home and Outer Signals at Rajbari were at danger and it is most likely that had the shunting train not passed the advanced starting Signal, which was also at danger, no accident would have occurred. But the Assistant Station Master, Babu B. B. Lahiri committed a breach of E. B. Railway rules in giving line clear after permitting the shunting and thereby contributed to the accident.

Recommendation.

11. The Eastern Bengal Railway Subsidiary Rule No. 255 (*a*) should be reworded so as to be incapable of mis-interpretation and a reference to it should be made in the note under Rule 254.

13. BENGAL AND NORTH-WESTERN RAILWAY.

FATAL ACCIDENT TO PEDESTRIANS ON THE MAHI BRIDGE BETWEEN PALEZA GHAT AND SONEPORE AT ABOUT 1 HOUR ON THE 27TH SEPTEMBER 1931.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 754-T., DATED THE 8TH MARCH 1932. (4139-T.).

In continuation of my letter No. 742-T., dated 1st March 1932, I beg to submit a report of an enquiry I held at Sonepore station on the 3rd March 1932 into the particulars of an accident on the Mahi Bridge between Paleza Ghat and Sonepore stations, on the Bengal and North-Western Railway, which occurred on the night of the 26th/27th September 1931.

2. The following officers attended the enquiry :—

Mr. G. A. Rowlerson, District Traffic Superintendent, Sonepore.

Mr. J. Robb, District Locomotive Superintendent, Sonepore.

Description of the Accident.

3. At about 1 A.M., on 27th September 1931 when a Down Mela Special from Paleza Ghat was crossing the Mahi Bridge No. 4 at mile 4 from Sonepore, a number of pedestrians were crossing the bridge in the opposite direction. Some of the pedestrians were knocked or jumped off the bridge into the river and from the information available it appears that 4 persons lost their lives in the accident.

Description of the Site of Accident.

4. The Bridge at which the accident occurred consists of 8 spans of 60 feet girders with plate decking and cross timbers. It crosses the Mahi Naddi which is a spill channel from the Ganges. The approaches are on high banks and the line is straight for two miles on the Paleza Ghat side and about half a mile on the Sonepore side of the bridge. This branch from Sonepore to Paleza Ghat, a length of 6 miles, is only open to traffic during the monsoon when the Ganges is in flood.

Conclusion.

5. I consider that the accident was due to the too prevalent custom of using Railway bridges as public roads, and that it would be unjust to hold any Railway servant or the Railway Administration responsible for the deplorable loss of life which occurred.

6. I consider that the driver of the engine E. C. D'Cruz was negligent in regard to certain of his duties, but I am satisfied that, under the circumstances, he could not have prevented the accident. The driver in his evidence stated that he whistled on approaching the bridge, this statement is confirmed by the fireman but is contradicted by the guard and also by one of the pedestrians on the bridge. It seems probable that he did not whistle as required in Subsidiary Rule No. 131 (1) but had he done so on approaching the bridge as required, it would probably have been too late to prevent the accident.

7. The guard stated that as his brakevan was coming on to the bridge a man shouted to him and that he thereupon showed a danger signal towards the engine and applied his hand brake several times. This is probably true, and it appears that the driver and fireman were negligent of their duty in regard to rule 123.

8. The guard's statement that after arrival at Sonepore the driver admitted to having seen people on the bridge is contradicted by the Assistant Station Master, besides the driver himself, and I consider their statements more reliable than the unsupported statement of the guard.

9. The driver was not aware of the speed restriction of 10 miles per hour on the branch line although this is published in the Working Time Table. His average

speed for the run was just over 10 miles per hour so it is probable that his statement that his speed on the bridge was 13 to 15 miles per hour is correct.

10. With the prescribed head lights, *i.e.*, two red buffer lights it would be almost impossible on a dark night for the driver to see people on the bridge, particularly if, as was probably the case, they were crouching or lying along the ends of the timbers in an attempt to avoid being struck by the engine. I do not think therefore that the driver could have prevented the accident although the fact that he did not know the speed restriction published in the Working Time Table and did not see the guard's signal, which must have been given after the accident occurred, is evidence of careless working on his part.

11. The guard was an unqualified man and was an unsatisfactory witness. In any case any action he took or could have taken to stop the train must have been after the accident as by the time his brakevan reached the bridge the engine was past the site of the accident.

14. MADRAS AND SOUTHERN MAHRATTA RAILWAY.

DERAILMENT OF No. 62 DOWN PASSENGER TRAIN AT MILE 147 BETWEEN INDI ROAD AND LACHYAN STATIONS (HUBLI--SHOLAPUR SECTION) AT ABOUT 17 HOURS ON THE 28TH SEPTEMBER 1931.

FROM MR. A. E. B. SULLEN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, MADRAS, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 31/319, DATED THE 14TH OCTOBER 1931. (4026-T.).

In accordance with Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit my report of the enquiry held by me into the circumstances attending the derailment of No. 62 Down Passenger, at mile 147 between Indi Road and Lachyan stations on the Hubli-Sholapur Metre Gauge section of the Madras and Southern Mahratta Railway, on the 28th September 1931.

2. The enquiry was held by me at Indi Road on the 2nd and 3rd October 1931 and was attended by District officers of the Railway and the Deputy Superintendent, Railway Police.

Description of the Accident.

3. The accident occurred at about 17 hours on the 28th September 1931. No. 62 Down Passenger was running to time.

4. The composition of the train was :—

	tons.
Engine (0-6-0) F. M.-117 (non-vacuum) and tender . . .	39·28
Six Passenger bogie coaches	99·42
4-wheeler Brake van	9·00

5. The engine after derailing, travelled 325 feet over the sleepers, it then appears to have dipped head foremost and to have been spun completely round, eventually falling on its right side. The couplings between the engine and the tender broke and the tender capsized across the rails. The leading third class bogie coach ran off at right angles to the track and was left tilted across the lines at an angle of 45°. The second bogie coach (third class and postal van) fell over and lay at an angle of 45° up against the engine. The third bogie coach ran into the tilted frame of the third class and postal van completely demolishing one side of this vehicle. The fourth vehicle (bogie 1st, 2nd and 3rd) only had its front bogie wheels derailed and suffered slight damage ; the remainder of the train composition, consisting of two 3rd class bogie coaches and a four-wheeled brake van did not leave the rails.

6. *Killed and injured.*—One 3rd class passenger (a woman) was killed outright ; another 3rd class passenger died whilst being conveyed to hospital. Three 3rd class passengers have subsequently died, making a total of five passengers killed to date (4th October 1931). Sixteen passengers and four train staff were injured. None of these, I am informed, are serious cases.

7. The message reporting the accident was sent by the Guard of 62 Down Passenger to Indi Road at 17-25 hours, 28th September 1931, message received by the Station Master at 17-45 hours, the all concerned message being despatched at 17-50 hours. A Local from Bijapur (No. 136) was cancelled at Indi Road and utilized as a relief train. Another relief train left Sholapur at 21-15 hours. The first relief train left the site of the accident at 23-15 hours and arrived at Bijapur at 1-35 hours on the 29th September 1931 with the injured for Bijapur hospital.

8. Station Master, Indi Road, on receipt of the accident message immediately informed the Magistrate and Civil Surgeon at Indi Road. The Civil Surgeon accompanied by the Magistrate arrived at the site of the accident at 19-30 hours.

9. The Guard, who is qualified to render first aid, dealt with the injured as far as possible. He was obliged to improvise bandages as his van was not provided with a first aid box.

10. A diversion had to be put in as it was impossible to clear the line of the wreckage. Through traffic was interrupted for 26 hours.

11. The approximate cost of damage to permanent way and rolling stock is Rs. 16,000.

Description of the Locality of the Accident.

12. There had been no rain on the day the accident occurred nor on the day previous. Visibility was good. The line from Indi Road (mile 145¾) which is on the level falls at 1 in 120 from about the outer signal for about half a mile, followed by a level run for another half mile followed by a fall of 1 in 165 for about three quarters of a mile. The line is straight, except for a two degree curve within station limits.

13. The derailment occurred on the 1 in 165 down grade, at nine feet beyond the 147th mile post (about a mile and a quarter from Indi Road station).

14. The permanent way consists of 41¼ lb. rails, 23′ 9½″ in length, laid on steel trough sleepers, nine sleepers per rail, sand ballasted.

Conclusions.

15. The District Engineer (Witness No. 9) in his evidence admits defects in the permanent way on a short length just ahead of mile 147 which he tested the morning after the accident. These defects in themselves would not in my opinion have caused the derailment. He also noted a slack in the road just about where the derailment occurred on the 24th September 1931 and communicated this to the Assistant Engineer. The type of steel trough sleeper in use tends to give a tight gauge, and with two keys per sleeper it is not possible to remedy this unless liners are resorted to. The ballast is said to be sand from the Bhima river.

16. The driver was not in a fit condition to give evidence.

17. A thorough examination of the engine was not possible, although attempts were made to excavate under the right hand side of the engine. The cylinder of the steam brake was opened, from this examination it appears that the steam brake was never applied. The hand brake on the tender had also not been applied. The position of the regulator showed that the driver had shut off steam. This engine only recently (17th August 1931) underwent light repairs at Gadag, re-wheeling and tyre returning. There are no facilities for weighing engines. They are just levelled.

18. The booked speed of 62 Down Passenger is 25 miles per hour and although the driver would be within his rights in travelling at 30 miles per hour, there was no occasion for him to exceed the booked speed seeing that his train was running to time. I think, it will be admitted, that the tendency of drivers on an undulating section with steep gradients is, after toiling up a grade, to indulge in a speed-up on a falling grade. Judging from the wreckage and the severe distortion of the rails I cannot help arriving at the conclusion that the driver was exceeding the speed limit. He could not have been on the alert as his steam brake had not been applied.

19. A broken spring hanger would have caused the accident but it was not possible to examine the hangers on the right hand side of the engine. Discrepancies in weights on the several wheels would have contributed to the accident, the oscillations synchronising with the slack in the road.

20. *Finding.*—After several inspections of the site of the accident and the evidence before me, I am of opinion that the accident was due to slacks in the road, aggravated by excessive speed of the train ; this is subject to further examination of the engine which is impossible at present owing to its buried condition.

21. A factor that may have influenced the derailment is the absence of weighing facilities at Gadag, the engine having been levelled and not weighed.

Recommendations.

22. It is suggested as desirable :—

(i) that all passenger trains be worked with engines fitted with the vacuum brake.

(ii) that first aid boxes be provided for all passenger trains (*vide* Railway Board's Circular No. 2673-T., dated 29th January 1930).

(iii) that facilities for weighing engines be expedited.

MGIPC—M—X-12—14-12-32—575.

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1. EASTERN BENGAL RAILWAY.

No. 20 DOWN PASSENGER TRAIN RUNNING INTO A BULLOCK CART AT LEVEL CROSSING NO. A-124, NEAR SARGACHI (MURSHIDABAD BRANCH) ON THE 31ST OCTOBER 1931.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 415, DATED THE 12TH MAY 1932. (4260-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith my report on an enquiry into the circumstances attending the above accident.

2. A Senior Subordinate Officers' Committee on the 10th December 1931 enquired into the circumstances attending the accident and I was favoured with a copy of the report of the proceedings of this enquiry on the 6th February 1932. After some correspondence, intended to elicit further information, I personally visited the level crossing No. A-124 on the 4th May 1932 with the Permanent-way Inspector concerned and supplemented the information already collected.

Description of the Accident.

3. At about 1-5 hours on the 31st October 1931, No. 20 Down Passenger train, when approaching the down outer signal of Sargachi Station ran into a bullock cart crossing the line from the right to the left at Level Crossing No. A-124. The cart was struck by the left buffer of the engine and was thrown in a badly damaged condition clear of the track and to the left of it. The cart driver and his bullocks escaped unhurt but a man who had been asleep in the body of the cart was killed. This man was pitched clear of the debris and ahead of it and as it was a dark night and the cart driver declared that he alone was in the cart, his body was not discovered until the train had left the site.

Description of the Locality.

4. Level Crossing No. A-124 (at mile 111/6) is the second of several between Sargachi (at mile 110) and Berhampore Court (at mile 115¼) on the Ranaghat-Lalgolaghat Branch of the Eastern Bengal Railway. The direction of the railway line through Sargachi, the level crossing and for a mile beyond the level crossing is nearly due North. The general direction of the road also is North and South and in order to cross the line at right angles at this level crossing it makes two curved sweeps in opposite directions with a short bit of straight where it crosses the railway in between. Approaching from the North the road is on the right of the line and curves left through about 90 degrees before it crosses the line and sweeps right to get nearly parallel again. In the quadrant formed by the first or left hand curve is the level crossing gate lodge. Thus for a train travelling southward and a cart also travelling southward, when approaching the level crossing the cart would be on the right of the train and the gatelodge on the left of the cart.

5. The line is fenced and the level crossing is provided with gates and turnstiles. The gates are about 25 feet back from the nearer rail on either side and are of the lift pattern. The gatelodge is about 10 feet nearer the rails than the gate on the same side. Thus for a man standing at the gate on the side from which the cart approached the view of the line on the side from which the train approached is obscured by the gatelodge. At the time of the accident there was no provision for fixing lights on the gates. At the time of my inspection sockets had been provided for fixing lamps but they were quite unsuitable. The gates are fitted with clips for holding them down either with or without padlocks.

Evidence.

6. Driver A. K. Muriel of 20 Down says he saw the cart being drawn across the level crossing from about a telegraph post length away, and whistled and applied his brakes. This I find a correct statement, for, between the time he could first have seen the cart in the beam of his head-light, after it passed the gatelodge, and the time the end of the cart passed over the left rail, assuming that the cart was moving steadily, about eight seconds would elapse, in which time the train, retarding from 35 miles per hour to 15 miles per hour, would travel about 211 feet.

7. The evidence of everybody except the gatekeeper who ought to have closed the gates, and his son, tends to show that the gates of the level crossing were open. The actual gatekeeper was Brojo. For some reason, probably not unconnected with previous service on the railway, he had given his name as Annada, son of Brojo, his son's name. But he was the actual gatekeeper, for it was he who was enrolled and medically examined for the post and it was he who answered the roll and received the pay of the post. He gave the name of a minor son when taking the post but it was he (Brojo) who was engaged and not the minor son.

8. Both Brojo and Annada say they closed the gates but did not lock them. I do not believe them. But if they did close the gates and not lock them, the first cartman passing through would open the gates and not close them again so that the effect of leaving them unlocked would then be the same as if they had been left open. If it were not for driver Muriel's statement that he saw only one man on the cart I should feel certain that the gates were open, for had they been closed, Rakhal Shaik, cartman. would have had to get up to open them and would have noticed the light of the engine and would either have held back or got through quickly. Rakhal Shaik, cartman, was probably not half asleep but wholly asleep when the cart crossed the level crossing. He was lucky to escape death or serious injury. He denied having anybody in his cart. This was probably due to mental aberration as an immediate result of the shock of the accident and not a deliberate lie.

9. An inspection of the road suggests that it is one of some importance and the Permanent-way Inspector told me on enquiry that at certain times of the year traffic on it is considerable. Rakhal Shaik, cartman, stated that he had used this level crossing late at night several times a month for two years. Others also probably used the road in a similar way. The road is unmetalled which makes the classification of this level crossing as C class quite correct. It is also a III class engineering gate according to the old classification and thus one gatekeeper is employed and the gates are normally closed. According to this classification at night the gates ought to be *locked* and opened only for the passage of road traffic.

10. If, as I am told, there is considerable cart traffic on the road at certain times of the year the duties if correctly performed of one gatekeeper on these gates during these times become heavy and his rest hours subject to very considerable disturbance. Only by actual observation can the amount of traffic over this level crossing and others on the same road be ascertained, but Brojo made no mention of his duties being onerous and if the cartman's statement is correct he did not correctly perform them.

11. The level crossing was never lighted at night for there were no means of fitting lights to the gates. If lamps were provided as stated by Brojo they were probably not gate lamps.

Conclusions.

12. The accident was due to the cartman Rakhal Shaik having an unobstructed passage through level crossing No. A-124 at the time that 20 Down also was passing through it, due to the failure of gateman Brojo to lock the gates in infringement of Rule 229(*b*).

Recommendations.

13. The Railway Administration should investigate the actual conditions on this road over a period of at least 12 months to ascertain whether or no a seasonal increase in the number of gatekeepers at some of the level crossings on this

road is necessary to avoid subjecting the gatekeepers to too long hours of duty at certain times of the year.

14. Wickets are not necessary according to the 1928 Specification for Level Crossings. Their non-provision, however, would make the gatekeeper's duties more onerous for he would have to open the gates for pedestrians and cyclists. Turnstiles are not convenient for the latter and a simpler form of wicket (that known as the Norfolk stile for instance) would be both cheaper and more convenient.

15. Lights of a suitable revolving type for use with left gates should be installed without further delay.

2. BURMA RAILWAYS.

DERAILMENT OF No. 134 DOWN MIXED TRAIN AT MILE 338/4 BETWEEN THAMYA AND SINTHEGAN STATIONS ON THE PYINMANA-KYAUK-PADAUNG BRANCH ON THE 5TH NOVEMBER 1931.

FROM MR. R. HATT-COOK, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A, RANGOON, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 815/15-A, DATED THE 17th NOVEMBER 1931. (4064-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I submit herewith a report of the enquiry held by me at Thamya on November 7, into the circumstances attending the derailment of 134 Down Mixed Train at mile 338/4 between Thamya and Sinthegan stations on the Pyinmana-Kyaukpadaung Railway at about 6-30 a.m. on 5th November 1931.

Departmental Officers attended the enquiry.

Description of the Accident.

The accident occurred at about 6-30 a.m. on November 5th, at mile 338/4 on the Pyinmana-Kyaukpadaung Branch.

The train concerned was 134 Down Mixed Non-vacuum Train with a total load of about 150 tons behind the tender. It was running approximately to time.

The Driver on rounding a left hand curve on to a down grade of 1 in 150 noticed that the line some distance ahead appeared to be sagging, he was then travelling about 20 miles per hour, he applied his steam and hand brakes and whistled for the guard's brake, on nearing the actual site of the accident he noticed that the bank had been partially washed away on the right, and seeing that an accident was inevitable and as he could do no more, he sat tight and waited until the engine capsized into a partial breach of the bank on the right side. The speed was stated to be about 5 to 10 miles per hour when the engine heeled over to the right. This would appear about right, as the engine had not ploughed up the ground to any great extent or been forced into it, it was just a case of toppling over, the tender came over with the engine completely on its side, a water tank and four goods wagons immediately behind the tender capsizing, and bunching up, the remainders of the train (excepting GYV. 13760 partially derailed) keeping the track. There were about 25 passengers on the train, none of whom were injured. The Driver who was slightly stunned pulled himself out of the engine after a bit, and on seeing his First Fireman, who had jumped clear, asked where his 2nd Fireman was. They eventually found him buried in the coal and on pulling him out, he stated he was only slightly bruised. About 40 feet ahead of the derailment there was a complete breach of the bank 100 feet long and about 20 feet deep across a fair sized stream, and 150 feet further ahead there was still another breach 30 feet wide and 10 feet deep, caused by a tributary of the main stream, so that the engine having derailed previously by a partial wash away of the bank, saved a serious accident. The track was carried sideways with the engine, and the track was festooned over the main breach. It appears that local heavy rain had fallen since about midnight causing the flood water to pile up against the bank, and top it, as the only bridge to drain the site was a 2 × 2′-6″ pipe culvert. The bank appeared to be composed of soft sand stone mixed with sandy clay. At the time the Keyman stated he fell into the stream the bank must have been completely breached, this was about 5-30 a.m. At 6-30 a.m. the water had subsided to a depth of about 5 feet. The depth of water against the bank when it was topped must have been about 25 feet from bed of stream. The direction of flow was from left to right with reference to the direction of the train.

The Keyman was on the side away from the accident, but after being pulled out of the water he could have stopped at site or crossed on the festooned track and thus warned the driver, knowing a train was due.

Description of the Locality.

With reference to the train, the track rises for 2 miles up a 1/125 gradient and enters a 4 degree left hand curve at the summit, which ends on the level. The track then falls at 1/150 on the straight through a cutting for about 650 feet then a short stretch of level and so on to the high bank which seals the stream on a 1/150 up grade. Having crossed the stream the track then goes on to a right hand 8 degree curve up the 1/150 grade.

The country is much broken up and falls at a considerable slope from left to right of track, the stream appears to drain a considerable area, and the only bridge at site is a 2× 2′-6″ pipe culvert. The tributary referred to joins the main stream at, and left of the bank. There is a D class Level Crossing at mouth of cutting.

Conclusions.

There is no doubt that the cause of the accident was due to the bank being about half washed away by flood water on the right side with respect to the direction of train.

The speed could not have been high (*a*) on account of the 2 miles rise of 1/125, (*b*) when the driver saw the sag in the track, he applied all his brake power, and whistled for more, (*c*) the engine had not ploughed into the ground to any great extent, so that it appears the speed would have been about 10 miles per hour at time of accident. It was just before sunrise, the sky was clouded, it was not raining, and the headlights were burning, and according to the driver, visibility was fair for he could see the sag in track shortly after passing the curve. The driver was not aware of the partial breach until quite near it, in any case he could not have saved an accident as he applied all his available brakes when he had taken in the situation, and the train was non-vacuum. As regards the patrolling Keyman, both he and the mate agreed that heavy rain began to fall between 12 and 1 o'clock that night, yet they stopped in their hut until 5 a.m. Knowing that a train was due at about 6-30 past their hut which is at mile 337/11-12, they should have gone on patrol earlier as the rain was unusual, even though no previous breaches had occurred on this section, since the line was opened for public traffic on 21st December 1929. However having gone on patrol and having come to a serious breach in the line, the Keyman's patrolling became entirely ineffective, by his rushing back to his gang to warn the mate. Had he stopped at site, and given signals to the driver (when the engine came into view) to draw his attention at once to the danger or endeavoured to cross the festooned track when the water subsided, he could probably have saved an accident. The evidence points to the fact that the water had subsided considerably before the accident. I discredit the Mate's statement that " the water was flowing over the sag in the rail when he arrived. After 2 hours it subsided somewhat". When the Keyman arrived shortly after 5 a.m. the bank was breached, this was a full hour before the arrival of the train. It therefore appears impossible for the water to have flowed at top level for that hour. As the bank had been impounding the stream all night, and rain had ceased some time before the accident, it is far more probable that when the breach was formed, the water began to subside almost at once, with a 25 feet difference in level on the down stream side of the track. He knew of the running of the train, and his excuses when questioned closely as to why he did not try and save the train were too futile to record. In other words he had no excuse, and I therefore hold him greatly to blame for the accident. He has failed to comply fully with Subsidiary Rule No. 200 (2) of General Rules.

It is quite patent that the important duty of patrolling is treated with levity by this mate, for he proceeded to do so at 5 a.m., several hours after the heavy rain. It is an all important part of Mate's duties to patrol the line during heavy and sudden rain, as on this occasion, and to patrol systematically and with some semblance of common sense, and this can only be instilled into them by giving them very definite and clear orders on the subject. Although a breach had never threatened here before, the line is a comparatively new one, and that appears in itself to be all the more, an incentive to have a rigid system of patrolling to safeguard the travelling public, and the train staff.

The Keyman was not of a type to be employed as such, he has one bad eye and is a human weed, and his intelligence appeared to be of a low order.

Keymen should be selected men, so that they can take the Mate's place while sick or on leave or in an emergency, and the selection of such men should rest with the Permanent-Way Inspector subject to the District Engineer's or Assistant Engineer's approval. In this case he appears to have made a bad selection, and he should be carefully instructed by his immediate superior on this subject of selection.

General.

The arrangements for repairing the line were good, a 40 feet span temporary bridge is being erected across the stream. A permanent bridge will be necessary.

Transhipping arrangements, and comfort of passengers were well attended to. Accident Specials were soon on the site, considering the lead. The first to arrive was Pyinmana Accident Special at 16 hours, but the cranes could not be brought to work owing to the breaches being between them and the accident.

Through communication was restored on 10th instant at 12-15 hours. Damage to rolling stock including rerailing charges is Rs. 1,000. Damage to Permanent-way including repairs to breach and temporary arrangements is Rs. 6,000. Total detention to through traffic is 5 days and 6 hours. Cost of transhipping arrangements including delays, etc., is Rs. 445.

Recommendations.

1. That a suitable bridge be built at this spot before next rains. It is a well defined stream joined by a tributary at site of bank, therefore possibly some protection work will be necessary.

2. That special attention be paid to a regular system of patrolling, even though breaches have not occurred in the past. District Engineers to pay special attention to this and issue the necessary orders on the subject.

3. Keymen should be selected men, fully conversant with the duties of a mate.

3. ASSAM BENGAL RAILWAY.

COLLISION BETWEEN No. 4 DOWN MIXED TRAIN AND A LIGHT ENGINE NEAR MILE 185 BETWEEN SRIMANGAL AND BHANUGACH STATIONS ON THE 3RD DECEMBER 1931.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 866, DATED THE 18TH DECEMBER 1931. (4079-T.)

In accordance with Rule 7 of the Accident Rules published under Railway Board Notification No. 1926-T., dated 19th March 1930, I held an enquiry at Srimangal on the 9th December 1931, into the circumstances attending the above accident, and beg to report as below :—

2. The following District Officers of the Assam Bengal Railway assisted at the Enquiry :—

Mr. S. N. Dutt, District Engineer, Mymensingh.

Mr. S. C. Das, District Traffic Superintendent, Badarpur.

Mr. W. A. Fosberry, Assistant Locomotive Superintendent-in-charge, Badarpur.

3. The Magistrate of Moulvi Bazar, Mr. Syed Nabib Ali Chowdhury, and the Inspector of Railway Police, Badarpur, Mr. J. M. Mazumdar, were present throughout the proceedings and the former recorded evidence at it on his own behalf.

Description of the Accident.

4. On the 3rd December 1931, 4 Down Mixed Train composed as follows :—

Mikado Type (2-8-2) Engine No. 205 $\frac{YD}{1}$, weighing 80 tons followed by, first, 28 goods vehicles (all covered four wheelers except the 5th which was a bogie petrol tank), next, 7 passenger coaches and, finally, 1 more covered goods vehicle, (total weight of the train behind the engine 550 tons), proceeding from Bhanugach to Srimangal, at about 14-30 hours, near mile 185, collided head-on with Up Light Engine 86-H (weighing about 59 tons) proceeding from Srimangal to Bhanugach. The engines locked and both were badly damaged. Of the Stock on 4 Down, reckoning from the engine and counting the Engine as No. 1, the 3rd, 4th, 5th, 6th, 8th and 9th vehicles were derailed, the 4th and 5th (which were thrown clear of the track) of all four wheels, the 9th of its leading pair of wheels only and each of the remainder of the trailing pair of wheels only. The 4th and 5th vehicles telescoped. All the derailed vehicles were loaded covered goods wagons except the 6th which was a loaded bogie petrol tank. The damages to locomotives and rolling stock were considerable and are valued approximately at Rs. 10,000. The damage to Permanent-way is estimated at Rs. 210.

5. Six persons received injuries that were attended to by the Medical Officer of Kamalganj Dispensary. Of these four were the engine crew, including a temporary extra fireman, of the Light Engine and one was the driver of 4 Down ; the sixth was a boy passenger. Two Indian women passengers were said to have sustained slight injuries, but they would not give their names and addresses or accept medical attention and walked to Srimangal station. Nobody was seriously hurt and the engine crews were able to attend the enquiry on the 9th.

6. The accident occurred in broad daylight in clear weather. 4 Down was fully vacuum fitted and vacuum active.

Description of the Locality.

7. Srimangal and Bhanugach are Assam Bengal Railway stations on the Main Line between Akhaura and Badarpur, 179¼ and 186¾ miles respectively

from Chittagong. There are several curves as sharp as 4 degrees and many deep cuttings between mile 181 and mile 185½. Except for a long 1 degree curve between mile 186 and mile 186½ the remainder of the 7½ miles between the stations is straight. There are rising grades from both stations to mile 183¼ the summit. The ruling grade is 1 in 150. Near mile 185 where the collision occurred the line is in deep cutting on a left handed 4 degree curve and with grades rising 1 in 200 to 1 in 150 in the down direction. The cutting sides are well wooded and overgrown with bushes and the unobscured view of the track in the cutting is about 500 feet, from any one point in the middle of the cutting to where the track disappears round the curve.

Note on the Evidence.

8. There is no doubt whatsoever that Driver S. K. Mazumdar of Up Light Engine No. 86-H on 3rd December 1931 left Srimangal from Bhanugach without authority to proceed. He was transferring this Engine from Akhaura to Lumding and had not on it the wire file on which he usually impaled his line clear tickets and he therefore placed these on receipt in his pocket. He had arrived at Srimangal on proper authority, stopped at the water column, where he watered and attended to his engine, and, nine minutes later, imagining that he had received his line clear ticket, left the station without further ado. He did not realise he had no authority to leave Srimangal until after the accident occurred.

9. There is confliction of evidence, however, when it comes to the question of what steps were taken by the Traffic staff to prevent the impending collision or minimize its effects.

10. According to the Line Clear Books :—

Bhanugach received the out report of 4 Down from Shamshernagar, the station next above it, at 13-56 hours ; Srimangal received the out report of Up Light Engine No. 86-H from Satgaon the station next below it at 13-35 hours. Srimangal, at 13-41 hours, signalled an enquiry to Bhanugach for Line Clear for Up Light Engine. Bhanugach shows this message as received at 13-57 hours (which I believe was about the actual time of receipt). At 14-4 hours Bhanugach asked Srimangal to cancel his enquiry and detain Up Light Engine at his station. Srimangal shows this message as received at 14-4 hours. There is also complete agreement between Bhanugach and Srimangal as to the time line clear for 4 Down was signalled by the one and received by the other. This time is 14-6 hours.

11. When it comes to the time of signalling and receiving the out report of 4 Down there is disagreement. Srimangal shows this message received at 14-25 hours. Bhanugach shows that it was signalled at 14-20 hours and again at 14-32 hours.

12. To my mind the Line Clear Books indicate the following :—

There was no great disagreement between the clocks at Srimangal and Bhanugach. The time check slip at Srimangal showed that the station clock tallied with signalled time on 3rd December 1931. The time check slip for Bhanugach was not produced, but the Station Master assured me that the variation of the clock from the correct time was always less than one minute either way. The enquiry and line clear messages regarding 4 Down between the two stations exhibit complete agreement as to times. The staff at Bhanugach became active on the Morse Instruments a few minutes before the time 4 Down was booked to arrive at Shamshernagar, the booked time being 13-53 hours. Before that time Srimangal's enquiry for line clear for the Up Light Engine was not accepted. On the other hand, Srimangal staff had been active from an earlier hour in connection with the movement of the Up Light Engine. After giving Line Clear for 4 Down at 14-6 hours they slacked off. 4 Down is booked to leave Bhanugach at 14-13 and to arrive at Srimangal at 14-32 hours so that there were several minutes available for relaxation. At 14-20, when Bhanugach says he first signalled the out report for 4 Down, the absence of the Up Light Engine from Srimangal was discovered and thereafter there is no agreement in the times of messages. Bhanugach shows that the out report was sent at 14-20 hours and again at 14-32 hours. Srimangal enters the time as 14-25 hours. I accept the Bhanugach's timings as correct. The Up Light Engine probably left Srimangal about 14-10 and 4 Down Mixed left Bhanugach about 14-15 and at 14-20 there was no means of stopping either.

Conclusion and Recommendations.

13. The accident was due to driver S. K. Mazumdar leaving Srimangal station without authority to proceed, whereby he broke General Rule No. 381. Unless very great care is exercised the mistake this driver made of imagining he had received his line clear ticket when he had not is likely to recur. The provision of files for holding line clear should not be left to the drivers themselves but should be provided of an approved pattern on all locomotives and fixed in such a position as to be readily visible to the men on the foot plate.

14. There does not appear to be any rule whereby a station master can be held responsible for the escape of a light engine from his station. In the absence of starting signals a rule requiring the station master on duty personally to hand the line clear ticket to the driver of a light engine and personally to hand-signal him to proceed, when he is ready to leave, with a corresponding rule that no driver of a Light Engine shall leave a station without exchanging signals with the Station Master might be worth consideration.

4. GREAT INDIAN PENINSULA RAILWAY.

DERAILMENT OF 12 VEHICLES OF No. 33 DOWN PARCEL AND III CLASS PASSENGER TRAIN AT MILE 43/9-10 BETWEEN KALYAN AND IGATPURI ON THE 17TH DECEMBER 1931.

FROM LT.-COL. M. T. PORTER, R.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 6, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1, DATED THE 4th JANUARY 1932. (4088-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T, dated 19th March 1930, I forward herewith the report of my enquiry into the above accident, held at Kalyan station on the 21st December 1931.

2. Representative Railway officers were present at the enquiry.

Description of the Accident.

3. No. 33 Down Parcel and III Class Passenger train *Ex*-Bombay for Delhi left Titvala station at 2-55 hours (right time) on the 17th December 1931, and was derailed a few minutes after 3-00 hours at mile 43/9-10.

4. The composition of the train was as follows :—

		Weight Tons.
Electric Locomotive No. GEC/3001 Passenger		114
G. I. P. C. W. No. 20979 Passenger		15
,, F. P. V. No. 22 Passenger		16
,, F. P. V. No. 31 Passenger		16
,, L. V. No. 2153 Passenger		14
,, F. P. V. No. 98 Passenger		16
,, L. V. No. 2152 Passenger		14
,, L. V. No. 2416 Passenger		13
,, L. V. No. 1791 Passenger		14
,, L. V. No. 2198 Passenger		14
,, L. V. No. 2173 Passenger		14
,, T. P. C. No. 6250 Passenger		12
,, T. B. No. 4165 Passenger		40
,, T. B. No. 4144 Passenger		39
,, B. B. No. 5503 Passenger		42
,, B. C. No. 5716 Passenger		23
,, B. C. No. 5746 Passenger		23
,, B. C. No. 5738 Passenger		22
,, B. C. No. 5726 Passenger		23
,, M. P. V. No. 54 Passenger		16
,, B. K. No. 1286 Passenger		13

5. When the train was at mile 42/10 a mile before reaching the point of derailment a water buffalo charged broad-side on the Parcel Van No. 2153, the 4th from the engine and struck the foot steps. It fell from this and became entangled in the axle guard and wheels of the next vehicle, which was Parcel Van No. 98. The latter vehicle derailed 2 rail lengths further on, the body of the buffalo being carried about 140 yards before it dropped off between the Up and Down lines.

The derailed vehicle was dragged over the sleepers for about a mile and passed over 2 small girder culverts.

6. On reaching mile 43/8 the train parted and some vehicles capsized, though it is impossible to ascertain the exact sequence of events. The train parted in 2

places, the front and rear portion remaining on the line, and vehicles Nos. 5 to 15 from the engine completely derailed, Nos. 9 and 10 were lying on their sides and No. 11 was completely wrecked.

7. Two overhead electric track equipment structures Nos. 43/9 and 43/10 were demolished having been struck on the down side of the track by the derailed vehicles and the overhead equipment became earthed and was automatically isolated at the feeding points.

8. One Great Indian Peninsula Railway train parcels clerk was killed, he was travelling in reserved 4 wheel coach No. 6250, the 11th from the engine. One train parcels clerk was seriously injured and another slightly, there were also light injuries to four 3rd class passengers.

9. First aid was administered to the injured by the train staff from the First Aid Box on the train, and medical aid arrived with the first break-down train from Kalyan at 6-00 hours. The Byculla break-down train arrived at 8-00 hours and at 8-30 took the passengers and injured persons back to Bombay.

10. Both roads were blocked, the Down road by the derailed train and the Up road by the damaged structures and wiring.

The Up road was cleared of debris, and single line communication restored by steam traction at 16-30 hours the same day, and at 23-45 hours on the 18th double line service was restored, the overhead wiring being supported on temporary structures.

Description of the Locality of the Accident.

11. The accident took place on the double line electrified section between Kalyan and Igatpuri, the speed of the train was about 40 miles per hour, the weather was clear moonlight and the engine carried a head light.

12. The track consists of 100 lb. B. H. rails 36 feet long on 15th Jharrah wood sleepers per rail, it is fully ballasted and in good order, the sleepers are rather worn though fit for some 2 years more in the main line. Gauge and levels on both sides of the site were in good order.

13. The line is straight and on a falling grade in the down direction of 1 in 150 from mile 42/2 to 42/16, then level to 43/7 and again a fall of 1 in 220 to 43/10. The usual custom of drivers is to shut off power on reaching mile 42 and roll down the slope. The formation is on ground level or low bank for all this distance.

Conclusions.

14. The primary cause of this accident was undoubtedly the collision of a water buffalo with the 4th vehicle of the train, its body becoming entangled with the wheels of the 5th vehicle, which was derailed. The subsequent overturning of a number of vehicles and parting of the train may have been due to a severe sidesway set up in the trailing vehicles, one of which came in contact with an electric equipment structure ; or alternatively the train may have parted first, the violent application of the automatic vacuum-brake being responsible for the side buckling of the component parts of the train.

Remarks.

15. Although careful enquiries were made as to how a buffalo could have obtained entrance to railway land, no satisfactory explanation is forthcoming. The line is fully fenced, and fencing in good order generally, though at one point the bottom 3 of the 5 wires are missing for some 40 yards, but a buffalo could not have passed beneath them.

There is a gate lodge near mile 42/9, and there is nothing to show that the gates were not shut and locked during the whole night.

16. The evidence of the guard and driver of the train show that there was no Iodine in the First Aid Box, though the bandages were in good order and the box had been found properly sealed up. In his evidence on this point the Assistant Surgeon, Kalyan, stated that this did not detract from the efficacy of the treatment, but at the same time I consider that steps should be taken that all First Aid Boxes are in good order and fully equipped, I am taking this up with the Great Indian Peninsula Railway Administration.

5. BENGAL NAGPUR RAILWAY.

No. 61 DOWN LOCAL TRAIN RUNNING INTO A BULLOCK CART AT MILE 94/7 BETWEEN CONTAI ROAD AND NEKURSENI ON THE 27TH DECEMBER 1931.

FROM MR. E. B. ROBEY, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 406/XIII/31, DATED THE 29TH FEBRUARY 1932. (4095-T.)

I beg to forward the proceedings of a joint enquiry regarding the above, the evidence recorded thereat was accepted by me. I held an enquiry at Contai Road on the 15th February 1932 and as nothing further could be elucidated I am not submitting a special report.

2. The road over the crossing is the main one between Khargpur and Puri and a census of traffic gave the following daily results :—

Motors 14-24, 4/7 by day, 3/7 by night.
Carts 108-160, 2/5 by day, 3/5 by night.
Bicycles 50-83, 2/3 by day, 1/3 by night.
Cattle 67-290, 2/3 by day, 1/3 by night.

3. Lifting barriers of a single bullie with a red disc in the centre are provided ; the usual coronation lights are placed for night use.

The road surface was from 1/2 to 1 inch below top of rails.

4. The lodge has an open verandah which was shut in with mats and cloth completely shutting out the view.

Around the lodge are bushes and scrub which obstruct the view.

5. The road on either side of the crossing runs more or less parallel to the railway and from some 200 feet away swings over the railway through curves to give a right angled crossing.

6. Approaching by road from the north the view of the track towards Waltair is open, and from the south towards Khargpur is obscured by the lodge and the bushes around it. In other directions from both sides road users have their backs to the railway except when on the curved approaches which are open.

7. Approaching by rail from Waltair the east approach is open, the west is partially obscured by the large bole of a tree.

From Khargpur the east approach is partially obscured by small trees and the west more or less completely by the lodge and the bushes around it.

8. I consider that the finding regarding the gatekeeper is correct but I do not think that Driver Blair is blameless for the following reasons :—

9(*a*). Fireman Ramaniah states he saw the gate was open from some 1,200 feet away and even though Driver Blair was on the right it is quite easy for him to see on both sides from 300 feet ahead of the boiler.

(*b*) Driver Blair admits he can pick out an object with the searchlight from some 700 feet yet he tries to make out he only saw the cart from 50 feet away I reject both his and the fireman's evidence on this point.

(*c*) Even with the large bole of the tree in the way it is possible to see clearly up to 40 feet from the track.

(*d*) Driver Blair alleges he was running at 25 miles per hour and yet after making an emergency application of the vacuum brake he ran for 900 feet before stopping ; I consider he could not have been doing under 40 miles per hour which he is entitled to do. His evidence and that of the fireman is typical of this class of men and must be rejected. Much has been made of the falling grade as it was as flat as 1 in 714 it can for all practical purposes be ignored. At 25 miles per hour he should have pulled up in 400 feet at the outside had he not been negligent.

He struck the cart amidships and evidently lost his head when he was caught unawares.

10. At these important crossings men only should be employed, the husband and wife system is unsatisfactory as the latter has to attend to her family and household duties and the man tries to do more than his legitimate share and fails.

11. The range of view should be improved by removing bushes etc. and steps should be taken to see that verandahs of lodges are kept clear.

12. When funds are available proper connected gates with up to date lighting for both road and rail should be installed.

13. I reject the evidence of the guard and engine crew regarding absence of lights, they have over reached themselves in their efforts to vindicate the driver.

There was no motive in the gateman not using the lights as he had a supply of oil and I consider he must be given the benefit of the doubt. I questioned several stray road users who habitually use the crossing at night and they stated they always saw the lights in use.

Proceedings of Joint Enquiry held at Contai Road on the 29th December 1931.

By Committee formed of—

President, Traffic Department, Mr. A. E. W. Robinson.

Member, Loco. Department, Mr. W. Woodfall.

Member, Engineering Department, Mr. A. O. Morrison.

Also present—

Mr. S. Dubey, Officer in charge KGP-GRP.

Mr. S. C. Chatterjee, IRP-KGP.

Nature of accident.—One bullock cart run into by 61 Down Local resulting in Cartman being killed.

At or between Stations.—At level crossing gate No. 92 between NSI & CNT.

Mileage and Telegraph Post.—Mile 94/7.

Time and date.—About 22/45 hours on 27th December 1931.

Number and class of Train or Engine or Vehicle.—61 Down Local.

Composition.—Engine, 5 bogie coaching vehicles, one 4-wheeler B. Van & 3 wagons. Length 452 feet excluding engine.

Cause of Accident.—*See* Joint Finding.

Damage to Rolling Stock.—Nil.

Damage to Permanent-way.—Nil.

Descriptive History.

On the night of the 27th December 1931 when 61 Down Local was approaching Contai Road Station, the Driver was observing signals from the off side of the engine and the Fireman was on the near side. The Fireman after looking out on the near side of the engine and having noticed no obstruction ahead applied the injector. The engine of the train was then within a very short distance of the level crossing situated at mile 94/7 over which a bullock cart was moving having passed the West Level Crossing gate which was either left open or else unlocked and unmanned. Before the Fireman or the Driver had fully realised the situation the engine of the train had reached the level crossing and collided with the bullock cart which resulted in the death of the driver of the cart, the destruction of the two bullocks and the demolition of the cart itself.

After the Driver and Guard had made enquiries concerning the accident and after the body had been left in charge of the Gateman, the train proceeded on to Contai Road Station.

Joint Finding.

We are of opinion—

1. that the cause of accident was due to negligence on the part of the Gateman.
2. that the person in fault is Gateman Muchiram for breach of rules 229(*a*) GRI and 229D SRI.

6. EAST INDIAN RAILWAY.

DERAILMENT OF No. 605 DOWN GREAT INDIAN PENINSULA PASSENGER TRAIN AT CAWNPORE CENTRAL STATION ON THE 2ND JANUARY 1932.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 3, LUCKNOW, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 602-T, DATED THE 19TH JANUARY 1932. (4117-T.)

In continuation of the brief report sent you under my No. 567-T., dated 7th January 1932 and in accordance with Rule 8 of Railway Department Notification No. 1926-T., dated 19th March 1930, I now beg to submit a full report on the enquiry I held at Cawnpore Central station, East Indian Railway, on the 6th January 1932, into the case of derailment of No. 605 Down Great Indian Peninsula Passenger train which occurred at that station on the 2nd January 1932.

2. The enquiry was attended by—

Mr. N. S. Sen, Assistant Superintendent, Transportation, Great Indian Peninsula Railway, Jhansi.

Mr. J. C. Lamb, Assistant Superintendent, Transportation, Great Indian Peninsula Railway, Jhansi.

Mr. D. M. F. Chisholm, Superintendent, Transportation, East Indian Railway, Allahabad.

Mr. H. Veal, Assistant Signal Engineer, East Indian Railway, Allahabad.

Mr. G. McLeod, Railway Police.

Description of the Accident.

3. At 10 hours on the 2nd January 1932 the engine of 605 Down Great Indian Peninsula Passenger which was received on the troop platform siding at Cawnpore Central collided with the buffer stop at the end of the siding and mounted the platform. One 3rd class female passenger was injured and taken to Hospital.

Conclusions.

4. The responsibility for the accident rests with the Driver of 605 Down Great Indian Peninsula Passenger who mistook the home signal for the dock platform line for the signal for the main platform No. 1 line.

5. There are two bracket home signals for the South line the upper and left hand one referring to the main and island platform lines, and the lower right hand signal No. 83 referring to the dock platform line only. The driver should have known these signals which are clearly defined in the station working rules. Had he been properly on the alert he should have realized, even without knowing the signals, that he was not being received on the main platform as (*a*) the lower of the two bracket signals was off and (*b*) he was running alongside the dock platform for its whole length about 1060 feet.

6. The driver had had three trips to learn the road and had been constantly on the section for about 15 months.

7. The driver made up three minutes in the run from Bhimsen, the last stop. His speed on approaching the station does not appear to have been excessive, had he been coming in on the main or island platform.

8. In extenuation it may be noted that—

(1) The driver had not been on this run for three months immediately prior to the accident;

(2) That he had never before been received on the dock platform line; and

(3) That according to his statement there were a number of men crossing the line and jumping on to the platform who distracted his attention.

9. To avoid the possibility of a recurrence I would recommend that when they are to be admitted on the dock platform line, drivers should be given a caution order to that effect at the last stopping station, or stopped at the outer signal and given a caution order there. As this dock platform line is very seldom used for the reception of trains the detention to traffic would be negligible.

7. NORTH WESTERN RAILWAY.

COLLISION BETWEEN AN UP LIGHT ENGINE WITH BRAKE VAN AND A MOTOR LORRY AT LEVEL CROSSING No. E.-56, MILE 59/22, (FEROZEPUR-BHATINDA SECTION) ON THE 9th FEBRUARY 1932.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. T./35, DATED THE 19TH FEBRUARY 1932. (4141-T.)

In accordance with para. 7 (1) of Government of India Notification No. 1926-T, dated 19th March 1930, on the 11th instant at Kot Kapura station I held an enquiry into the circumstances attending an accident that occurred at 19 hours on 9th February 1932 at level crossing No. E.-56 between Kot Kapura and Faridkot stations, North Western Railway.

2. The Divisional Officers of the Lahore Division of the North Western Railway were present as were also the Magistrate and Police Superintendent, Faridkot State, and Inspector, Punjab Railway Police.

Description of the Accident.

3. At 18-55 hours on 9th February 1932 the Engine and Brake Van of a down goods train were detached at Kot Kapura station and were to return light to Ferozepore Cantonment. At 19-00 hours about a mile out of Kot Kapura station the engine travelling tender foremost and with Brake Van only trailing at level crossing E-56, mile 59/22 struck a passenger lorry No. P-1780-B carrying 21 passengers.

4. The lorry was struck more or less in the middle smashed up badly and flung to one side against one of the gate lodges. The engine came to a stand after travelling 275 ft. from the crossing where the collision occurred.

5. Of the 21 passengers in and on the lorry, one, the cleaner, riding on the splash board was crushed and killed immediately. Fifteen others were more or less seriously injured of which one died in Faridkot hospital on 11th February 1932. The Driver of the Lorry is among the seriously injured.

The weather was clear but the night dark with a new moon.

Description of the site of the Accident.

6. The accident occurred at level crossing No. E.-56 (B Class with 2 men) mile 59/22, between Kot Kapura and Faridkot stations on the Ferozepur-Bhatinda section of the North Western Railway. The road is a metalled road connecting Faridkot, the Capital of Faridkot State, with Kot Kapura an important town in Faridkot State.

7. The line is straight as was also the road but the two crossed at a very acute angle and the road has been realigned parallel to the Railway which it crosses at right angles with short sharp right angle bends. The view along the Railway is not obstructed but the view along the road is obstructed from both sides by a single gate lodge built on either side of the track.

8. The crossing is protected by a single leaf gate on each side of the track, the two gates being coupled and working together. A gate lamp is fixed to each gate but the lamps are so placed that though visible to an approaching train they are both completely hidden by the gate lodges from the road approaches until one is right on them. There are no road signs to warn approaching road traffic.

The Evidence.

9. That the gates were open is admitted by all the witnesses and apparent from the collision. The story of the gateman Lal Din on duty that they were forcibly opened is rejected because

(i) The same story is told by every gateman under similar circumstances, and yet no one has ever had reports from gatemen of lorry drivers forcing or trying to force a gate open when no collision has occurred

(*ii*) The gateman Lall Din tells an impossible story when he asserts that a man came running ahead of the lorry to force open the gates and when the lorry driver could not see whether the gates were open or closed and the lorry was still out of sight.

(iii) On my return journey from Kot Kapura to Lahore open gates and inattentive gatemen were frequently met at both B & C Class crossings.

10. All the witnesses state that the gate lamps were not lighted except the two gatemen, and each of them is equally positive that he himself lighted the lamps. The two differ too as regards the time they were lighted, one maintaining they were lighted before the passage of 152 Down and the other after the passage of this train. I am of opinion that they were not lighted though I consider this is not of the slightest importance as the Engine Driver would not have stopped for lamps indicating open gates, and the lights are so placed as to be invisible to the Lorry Driver and in any case would have indicated to him a clear road.

11. Of the two gatemen, Lall Din was admittedly on duty and responsible for the closing of the gates. These two gatemen are reputed as two of the most attentive on the line which is borne out by the cleanliness and tidiness of the lodge and the really good garden plots maintained by them especially that by Lall Din.

Conclusions.

12. I am of opinion that Lall Din gateman on duty made no attempt to lock the gates across the road in time for the passage of the light engine and was directly responsible for the accident but principally because he was unaware of the approach of the train until it was too late. He had just passed 152 Down 15 minutes earlier and—

(1) Did not expect this light engine so soon.

(2) Probably busied himself with cooking his evening meal and did not hear the train approaching nor see its dim buffer lights whereas all gatemen are now inclined too much to rely on engine search lights and Lall Din's own story is that the man who knocked him down could not make out the approaching train.

(3) The train would not be visible unless the gateman was absolutely on the alert and very attentive, looking both ways for a train, which is unlikely.

Medical Relief.

13. The Permanent-way Inspector was the first person to receive the guard's memo which clearly states "Many injured". Instead of sending it on to the Station Master and the Bombay, Baroda and Central India Railway Medical Officer at his station, he went out to the accident and of course with his trolly. He then, when he got there, retained his trolly and after a preliminary enquiry returned himself to get the station master and medical officer nearly an hour later. He delayed medical aid reaching the injured for nearly an hour and in my opinion showed much less presence of mind in an emergency than should be expected from one of his service and salary.

14. Except for the delay caused by the Permanent-way Inspector the station and medical staff acted promptly and did all that was possible except in one particular mentioned in para. 18.

15. The Sub-Assistant Surgeon, Bombay, Baroda and Central India Railway, and Assistant Surgeon, Faridkot State, Kot Kapura, rendered all the help they could. The Chief Medical Officer and Police and Magistracy, Faridkot State at Faridkot, received the dead body and 9 seriously injured at Faridkot and made all arrangements for their careful transfer to the State Hospital, Faridkot, where these injured are under treatment and unfortunately one has died.

16. Some of the remaining injured were taken to the Faridkot State Hospital at Kot Kapura and are there under treatment.

17. All the Railway staff at the site were sure that there was one killed and 13 were injured but not a single member of the staff knew if all 13 injured had received

treatment or had been sent either to Faridkot or Kot Kapura for treatment. The full number 15 have been accounted for only 6 days after my enquiry.

18. The Divisional Medical Officer, Ferozepore, acted very promptly as regards the only injured reported to him, the 9 taken to Faridkot Hospital, and visited them on the 10th.

Recommendations and Remarks.

19. (1) The gate lamps of this crossing should be so placed that they give an indication of danger and safety to the road which is really more important than to the Railway.

(2) At metalled road crossings where there is much motor traffic as in this case, the Railway should provide road signs or demand their provision by the road authorities.

(3) In such cases of injuries to and death of persons when claims to compensation may arise the Commercial Department of the Railway concerned should obtain as early as possible all details of injuries, etc., so as to prevent fraudulent claims being preferred subsequently as to extent of injuries, status of injured, etc.

In this case a man was sent out very promptly from Lahore by the Administration but his enquiries were delayed as in the case of the Divisional Medical Officer by the fact that only the nine injured and one dead in Faridkot Hospital could be accounted for.

20. I am of opinion that Station Master when issuing all concerned messages in cases of accidents where there is a list of casualties should not give the name of any Railway Official supposed to be responsible as was done in this case. The probable cause of accident should be given but no names given of those considered responsible by the Station Masters, the fixing of this responsibility should be left to the officers making the subsequent enquiry.

22. The thanks of the Administration are due to the Faridkot State Medical and other authorities for the aid rendered.

8. EASTERN BENGAL RAILWAY.

No. 137 UP PASSENGER TRAIN RUNNING INTO A MOTOR LORRY AT MILE 16/6 BETWEEN DHAPDHAPI AND BARUIPUR ON THE 25th FEBRUARY 1932.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 366, DATED THE 5TH MAY 1932. (4164-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T, dated 19th March 1930, I submit below my report on an enquiry into the circumstances attending the above accident :—

2. An enquiry was held at Baruipur on the 8th March 1932 by a Railway District Officers' Committee, composed as follows :—

Mr. G. E. Goff, D.I.V.S., Calcutta, President,

Major Johnston, R. E., Executive Engineer, Member,

Mr. H. G. Scotter, District Loco-Superintendent, Member,

Mr. Banerjee, District Carriage and Wagon Superintendent, Member,

at which the following police officials were also present :—

Mr. S. C. Bose, Inspector, Railway Police, Naihati.

Mr. M. B. Ali, Sub-Inspector, Railway Police, Sonarpur.

3. I was favoured with a copy of the proceedings of the enquiry on the 8th April 1932, and found the evidence and finding completely acceptable. My report is therefore, based on this Committee's Enquiry and my subsequent visit to the spot in company with the Executive Engineer on the 23rd April 1932.

Description of the Accident.

4. At about 6-10 hours on the 25th February 1932, 137 Up Passenger Train bound from Lakshmikantapur for Calcutta collided at the level crossing at mile 16/6, between Dhapdhapi and Baruipur with a loaded motor lorry No. 2126. The lorry was smashed to pieces which were scattered about but the main portion of the chassis was carried after impact a distance of some 760 feet from the level crossing on the side of the line from which the lorry approached the track, *viz.*, the right side of the engine. The engine Buffer lamp, cowcatcher and hose pipe were slightly damaged. Three men on the lorry were killed outright, a fourth was severely injured and died within the hour ; the fifth and last man on the lorry escaped with slight injuries.

Description of the Locality.

5. The actual site of the accident is the C class level crossing, $16\frac{1}{3}$ miles from Calcutta, on the Lakshmikantapur Branch, which was opened to passenger traffic in December 1928. The line is unfenced and the level crossing being on an unimportant road has no gates and no gatekeeper. The line here is straight for $\frac{2}{3}$rd of a mile with the gate practically in the middle of the straight. Thus there is a straight reach of $\frac{1}{3}$rd mile on either side on which a train on the line can be seen from the level crossing. The direction of this straight for an Up train is North-West.

6. The road crosses the line at right angles but is very winding, particularly on the side from which the lorry approached the east side, where a left handed bend on the road terminates practically on the level crossing. On the west side the road is at right angles and straight for about 100 feet. The road is unmetalled except immediately near the level crossing and its twists and turns make it unfitted for motor traffic. Judging by one culvert seen its upkeep is not for the passage of loaded lorries.

7. There are no white posts to mark the level crossing as there should be, but there are warning signs, 200 feet from the level crossing on the east or curvilinear side and 135 ft. from the level crossing on the west or straight side, and the line is visible through the huts from near the warning sign on the East side.

8. Visibility up and down the line from the road is nil on the East side until practically on the level crossing, but for a car driver exercising due caution and approaching the level crossing slowly, at least a quarter of a mile of line would show up when about 15 feet short of the level crossing.

9. There is a slight ramp up from the road to within a very few feet of the line, which a driver of an overladen or labouring lorry might be tempted to take at the run.

Evidence.

10. There is one survivor of the accident, a cooly named Ram Dayal Teli employed by Messrs. R. D. Sarma and B. Singh. His statement shows that there were five men in the lorry of whom the driver and three men were seated on the driving seat while the witness himself rode on the load behind. He says the speed of the lorry was about 10 miles per hour which may be accepted as correct, and that the lorry and the train arrived at the level crossing simultaneously.

11. From the Committee's remarks it is clear that they read into Ram Dayal's evidence that the driver of the lorry was in the habit of travelling over this same road. This is not in Ram Dayal's recorded statement for he says " I have travelled on the same road, two or three times before this accident." He did not say " in this lorry behind this driver " but he may have implied it.

12. From the evidence of T. P. Ghose, Station Master, Baruipur, the train, 137 Up, was running to time. From the statement of the Engine Driver Bakridan he was travelling at the usual speed of 35 miles per hour when the lorry suddenly tried to cross the line close in front of his train.

13. There is nothing irreconcilable in any of these statements. The lorry cannot have been travelling very fast and must have reached the level crossing practically simultaneously with the train. The lorry would be obscured from the view of the driver of the train until within a very few feet, probably not more than 15 feet, of the line. It would take the lorry, at 10 miles per hour, about 1 second of time to cover this distance and the train would then be about 50 ft. away. But the Engine Driver in such circumstances would not see the lorry at once and might not be aware of it until he was practically on it.

14. On the other hand the driver of the lorry had his vision to the left, the direction from which 137 Up approached completely obscured by the three men who had crowded alongside of him on the driving seat and he does not appear to have given a thought to the need for caution in crossing the railway.

Conclusions.

15. The only person to whom any blame for the accident can attach is the driver of the lorry and he is dead. I cannot find the railway or its staff in any way to blame. The crossing should have had four white posts to mark its position but their absence had no bearing on the accident for the warning signs erected by the Railway indicated to road users the proximity of a level crossing. The presence of white posts would have apprised the driver of 137 Up from a fair distance of the exact position of the level crossing but in any case the sudden appearance of the lorry would have made it impossible for him to prevent an accident.

16. A census taken on two days of a weekly Hat, when traffic over the level crossing attains a maximum, showed that on the first day 5 vehicles used the level crossing in 12 hours and on the second none. Presumably for the remainder of the week there were none. With this very small traffic there is no justification for providing gates and a gatekeeper. If this were a road crossing a road, users of the lesser road would not dare cross without looking both ways, particularly as on the lesser road vehicular traffic is unusual.

17. But more wants to be done to protect the users of such public roads than is done by local authorities. A clear view of the line both ways should be possible

from 50 to 100 feet back and huts and plantations should not be allowed to grow up to restrict the view in any way. Specifications and Regulations for each province require to be drawn up by the Local Governments in consultation with the Railway Authorities.

18. In this case in addition to the four white posts which should be put up, whistle boards should be erected about 1,000 feet on either side.

9. EASTERN BENGAL RAILWAY.

No. 309 UP MIXED TRAIN RUNNING INTO A BULLOCK CART AT THE LEVEL CROSSING AT MILE 172/14-15 BETWEEN SITLAI AND KHETUR ROAD ON THE 10TH MARCH 1932.

FROM MR. F. R. MORGAN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 531, DATED THE 28TH JUNE 1932. (4288-T.)

In accordance with paragraph 8 of Notification No. 1926-T, dated 19th March 1930, I submit a report on an enquiry into the circumstances attending the above-named accident.

Description of the Accident.

2. At about 19-3 hours on the 10th March 1932, 309 Up Mixed train, running to time, between Sitlai and Khetur Road, ran into a bullock cart at the level crossing at mile 172/14-15. The cart was smashed to pieces, and the cartman and one bullock were killed. The cartman's body and a portion of the cart were carried on the forward part of the Engine until removed by human agency.

Description of the Locality.

3. Sitlai and Khetur Road are two stations, distant 168 and 174¾ miles respectively from Calcutta, on the Abdulpur-Amnura Branch on the Broad Gauge of the Eastern Bengal Railway. This branch is straight from mile 165 to mile 184 and its direction is approximately from South East to North West. Near the level crossing at mile 172/14-15 formation is in low cutting the spoil from which has been thrown in a rough bank on the right side. The front face of this spoil bank is some 36 feet from the centre of the track, the rear face some 60 feet. For sixty feet on either side of the line the road is at right angles to the railway line ; visibility up and down the line from the road is good, except for the length of 24 feet on the right side where it passes in deep cutting through the spoil bank. Enamelled signs indicating the approach to a level crossing are put up on the road upwards of 300 feet from the level crossing.

4. Four white posts mark the position of the level crossing and are clearly visible both from the road and from the railway. The road is an unmetalled village cart track, the railway is unballasted. The level crossing was in good order.

/Evidence.

5. The line was opened in March 1929. Up to the end of December 1931 the maximum speed sanctioned was 25 miles per hour and a time-table based on this speed was in force up to the 29th February 1932. With effect from the 1st March 1932 a new time-table came into force. This is based on a maximum sanctioned speed of 30 miles per hour, but is so made out that higher speeds must be run if trains are to keep time.

6. There are no eye witnesses of the accident and all that the witnesses examined can tell is what occurred after the accident and that from the point of view of the Railway only. The cart containing Badla Shaik, cartman, who was killed appeared to be alone on the road.

7. The evidence makes clear that the engine of 309 Up collided with a bullock cart at the level crossing at mile 172/14-15 on the Abdulpur-Amnura Branch on the 10th March 1932, it does not suggest how it occurred. The level crossing is unmanned and there is no good reason for manning it. The number of trains each way is two only and the condition of the road does not indicate a great deal of use by wheeled vehicles. Visibility is good for both road and rail users. When I inspected the level crossing on the 21st May 1932, the Permanent-way Sub-Inspector, Mr. Sher Afzal Khan, showed me where immediately after the accident

there was a mark of a cart wheel pivoting horizontally and I gathered that this cart was approaching from the right and had probably reached a position where its bullocks were just clear of the rails on the left while the wheels of the cart were still behind the rails on the right side when the Engine struck it. There was nothing to indicate whether or no the cartman had realised his danger before he was killed. The police think the cartman was asleep. It appears to be the accepted practice in these parts for cartmen to sleep when travelling in their carts after sunset. The probabilities appear to be in favour of the cartman being asleep. Had there been no change in the time-table a few days previous he would have got past the level crossing without mishap and it is not unlikely that he was unaware of the changes in train timings and speeds.

8. Had he been awake he might have been taken by surprise by the train for the following reasons :—

First.—The track is a quiet one because it is unballasted and in the cuttings metal sleepers are provided.

Second.—There are only two trains each way and up to 29th February 1932, ten days before the accident, the train expected across this level crossing near 7 p.m. was a *Down* train (due say 19-15) whereas in the new time-table the direction of the train crossing here near 7 p.m. was changed, the time of the *Up* train being about 19-3. To a villager living at some distance from the line the changes of times and directions of trains might be unknown for quite a long time after they were introduced.

Third.—There was a considerable increase in the speed of trains from 1st March 1932. Whereas the old *Down* train at about 19 hours was booked to cover the $6\frac{3}{4}$ miles between Khetur Road and Sitlai in 19 minutes, the new *Up* train was booked to cover the same distance in the opposite direction in 15 minutes, or about 25 per cent. faster.

Fourth.—The train had its electric high power headlight out of use and this a useful warning signal was inoperative.

Conclusion.

9. In the absence of evidence proving that Badla Shaik, the driver of the cart involved in this accident knew of the changes in time, speed and direction of the evening train I find that the accident was due to misadventure. The railway cannot be held responsible, but I think that failures of High Power Headlights on lines where they are in regular use should be taken very seriously, for such failures are likely to endanger the lives of users of level crossings by the removal of what is a very effective signal of a train's approach. On the rare occasions that a high power headlight fails and a train has to proceed with ordinary lights, audible warnings such as bells or whistles should be resorted to before level crossings and the train speed reduced if there are many level crossings or much crossing of the railway line by human beings and cattle.

MGIPC—M—X-25 (P.D.)—22-3-33.—575.

P.R.B.—RA/12.

Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

which occurred during the

Half-year ending the 30th September 1932.

No. 12

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N. M. Roy Chowdhury & Co., 11, College Square, Calcutta.
Grantha Mandir, Cuttack.
B. C. Basak, Esq., Proprietor, Albert Library, Dacca.
Higginbothams, Madras.
Rochouse & Sons, Madras.
G. A. Nateson & Co., Publishers, George Town, Madras.
P. Varadachary & Co., Madras.
City Book Co., Madras.
Law Publishing Co., Mylapore, Madras.
The Booklover's Resort, Taikad, Trivandrum, South India.
E. M. Gopalakrishna Kone, Pudumandapam, Madura.
Central Book Depôt, Madura.
Vijapur & Co., Vizagapatam.
Thacker & Co., Ltd., Bombay.
D. B. Taraporevala Sons & Co., Bombay.
Ram Chandra Govind & Sons, Kalbadevi Road, Bombay.
N. M. Tripathi & Co., Booksellers, Princess Street, Kalbadevi Road, Bombay.
New and Secondhand Bookshop, Kalbadevi Road, Bombay.
J. M. Pandia & Co., Bombay.
A. H. Wheeler & Co., Allahabad, Calcutta and Bombay.
Bombay Book Depôt, Girgaon, Bombay.
Bennett, Coleman & Co., Ltd., The Times of India Press, Bombay.
The Popular Book Depôt, Bombay.
Lawrence & Mayo, Ltd., Bombay.
The Manager, Oriental Book Supplying Agency, 15, Shukrawar, Poona City.
Rama Krishna Bros., Opposite Vishrambag, Poona City.
S. P. Bookstall, 21, Budhwar, Poona.
The International Book Service, Poona 4.
Mangaldas & Sons, Booksellers and Publishers, Bhaga Talao, Surat.
The Standard Book and Stationery Co., 32-33, Arbab Road, Peshawar.
The Students Own Book Depôt, Dharwar.
Shri Shankar Karnataka Pustaka Bhandara, Malamuddi, Dharwar.
The English Book Depôt, Ferozepore.
Frontier Book & Stationery Co., Rawalpindi.
*Hossenbhoy Karimji and Sons, Karachi.
The English Bookstall, Karachi.
Rose & Co., Karachi.
Keale & Co., Karachi.
Ram Chander & Sons, Ambala, Kasauli.
The Standard Bookstall, Quetta and Lahore.
U. P. Malhotra & Co., Quetta.
J. Ray & Sons, 43, K. & L., Edwardes Road, Rawalpindi, Murree and Lahore.
The Standard Book Depôt, Lahore, Nainital, Mussoorie, Dalhousie, Ambala Cantonment and Delhi.
The North India Christian Tract and Book Society, 18, Clive Road, Allahabad.
Ram Narain Lal, Katra, Allahabad.
"The Leader," Allahabad.
The Indian Army Book Depôt, Dayalbagh, Agra.
The English Book Depôt, Taj Road, Agra.
Jaya Prasad & Sons, Agra.
Narayan & Co., Meston Road, Cawnpore.
The Indian Army Book Depôt, Jullundur City, Daryaganj, Delhi.
Manager, Newal Kishore Press, Lucknow.
The Upper India Publishing House, Ltd., Literature Palace, Ammuddaula Park, Lucknow.
Rai Sahib M. Gulab Singh & Sons, Mufid-i-Am Press, Lahore and Allahabad.
Rama Krishna & Sons, Booksellers, Anarkali, Lahore.
Students Popular Depôt, Anarkali, Lahore.
The Proprietor, Punjab Sanskrit Book Depôt, Saidmitha Street, Lahore.
The Insurance Publicity Co., Ltd., Lahore.
The Punjab Religious Book Society, Lahore.
The Commercial Book Co., Lahore.
The University Book Agency, Kachari Road, Lahore.
Manager of the Imperial Book Depôt, 63, Chandni Chowk Street, Delhi.
J. M. Jaina & Bros., Delhi.
Fono Book Agency, New Delhi and Simla.
Oxford Book and Stationery Company, Delhi, Lahore, Simla, Meerut and Calcutta.
Mohanlal Dosabhai Shah, Rajkot.
Supdt., American Baptist Mission Press, Rangoon.
Burma Book Club, Ltd., Rangoon.
S. C. Talukdar, Proprietor, Students & Co., Cooch Behar.
The Manager, The Indian Book Shop, Benares City.
Nandkishore & Bros., Chowk, Benares City.
The Srivilliputtur Co-operative Trading Union, Ltd., Srivilliputtur (S. I. R.).
Raghunath Prasad & Sons, Patna City.
The Students' Emporium, Patna.
K. L. Mathur & Bros., Guzri, Patna City.
Kamala Book Stores, Bankipore, Patna.
G. Banerjea & Bros., Ranchi.
M. C. Kothari, Raipura Road, Baroda.
B. Parikh & Co., Baroda.
The Hyderabad Book Depôt, Chaderghat, Hyderabad (Deccan).
S. Krishnaswamy & Co., Teppakulam P. O., Trichinopoly Fort.
Standard Book and Map Agency, Booksellers and Publishers, Ballygunge.
Karnataka Publishing House, Bangalore City.
Bheema Sons, Fort, Bangalore City.
Superintendent, Bangalore Press, Lake View, Mysore Road, Bangalore City.

AGENT IN PALESTINE :—Steimatzky, Jerusalem.

*** Agents for publications on aviation only.**

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1. NORTH WESTERN RAILWAY.

No. 292 DOWN PASSENGER TRAIN RUNNING INTO A BULLOCK CART AT MILE 32/15-16 BETWEEN DALOWALI AND RANBIRSINGHPURA ON THE 5TH APRIL 1932.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 5-A/T., DATED THE 17TH SEPTEMBER 1932. (4208-T.)

With reference to your letter No. 4208-T., dated 9th September 1932, I beg to send in original copy of proceedings received from Agent and say that I accepted the finding and the recommendations made. I did not make a separate report because I did not consider it necessary.

PROCEEDINGS OF AN OFFICIAL ENQUIRY HELD AT SIALKOT ON 8TH APRIL 1932, TO ENQUIRE INTO THE PARTICULARS OF AN ACCIDENT WHICH OCCURRED AT MILE 32/15-16 BETWEEN DALOWALI AND RANBIRSINGHPURA ON 5TH APRIL 1932.

On 5th April 1932 at about 7-40 hours train No. 292 Down ran over a country cart at mile 32/15-16. Maula Dad, S/o Wazira, the Driver of the bullock cart, and both bullocks were killed and the cart was completely smashed. The train was immediately stopped and the dead bodies were handed over by the Guard to Gang Mate Faqir Mohd. for custody till arrival of the Police.

2. This level crossing is actually a C Class cattle crossing without gates or gateman. The distance from the centre of the track to the centre of the Grand Trunk Road is 82 feet only and the path from the Grand Trunk Road to the level crossing runs down the embankment of the Grand Trunk Road which is fairly steep.

Damages to Rolling-stock, Locomotive, Permanent way—*Nil.*

Finding.

We having carefully considered all the evidence, do find as follows :—

The accident is due to the rashness of the cart Driver Maula Dad, for attempting to cross the level crossing when a train was so close to it.

The Driver of 292 Down naturally could not assume that the driver of the bullock cart was trying to beat the train over the level crossing until it was too late to avoid the collision.

We have examined the site of accident and are of opinion that the view of the level crossing is quite clear both from the Grand Trunk Road and the Railway Line.

Recommendations.

We understand that the level crossing at mile 32/15-16 is very frequently used by country carts as well as cattle. We recommend that a census be taken and provision made for Gate and a Gateman if necessary.

2. BURMA RAILWAYS.

DERAILMENT OF No. 92 DOWN LOCAL MIXED TRAIN AT MILE 206 BETWEEN KALAWTHUT AND KWANHLA ON THE MOULMEIN-YE RAILWAY ON THE 13TH APRIL 1932.

FROM MR. E. C. WHELAN, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A, BURMA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 304/11-A. DATED THE 3RD MAY 1932. (4211-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith a report of the enquiry held by me at Kalawthut on 28th April 1932, into the circumstances attending the derailment of 92 Down Local Mixed train at mile 206 between Kalawthut and Kwanhla on the Moulmein-Ye Railway at 7-20 hours on 13th April 1932.

The following Officers attended the enquiry :—

District Traffic Superintendent, Moulmein-Ye.

Assistant Engineer, Moulmein-Ye.

Assistant Loco. Foreman, Moulmein-Ye in the unavoidable absence of the District Locomotive Superintendent, Toungoo.

Description of the Accident.

The accident occurred at about 7-20 hours on 13th April at mile 206 on the Moulmein-Ye Branch.

The train concerned was 92 Down Local Mixed train which was running about 2 minutes late. The driver was approaching Kalawthut in the ordinary manner and at usual speed when suddenly at mile 206 he noticed a very severe bump. He immediately applied his brakes and signalled to the guard to assist with his brake.

On the train coming to a stand, it was found that all vehicles except the four wagons next to the engine were derailed and some of them capsized.

No passengers were hurt, mainly owing to the fact that the passenger vehicles were derailed in a small cutting and they rested against the sides of the cutting instead of overturning.

The weight of the train was 225 tons.

Description of Locality.

The line is straight and level for a distance of half a mile on either side of the site of the accident and there is a cutting of about 4 feet depth extending for about 200 feet on the Kalawthut side of the site.

The actual site is at bridge No. 73, mile 206. This bridge, which is a 4 feet flat top, R. C. slab culvert, has recently been built to replace two 18 inch C. I. Pipes which were badly corroded and has been in use without any restriction of speed for a period of one month and has given no trouble during this period.

The surrounding country is comparatively flat and covered with small undergrowth. There is a line of low hills on the east side of the line at a distance of 2 or 3 miles.

The track is fully ballasted, sleepers and rails are good and the standard of maintenance in the vicinity is of a high order.

Conclusions.

The accident was due to the track having subsided over bridge No. 73 at mile 206 owing to very heavy rain during the early morning of 13th April 1932.

Why this subsidence should have occurred is not apparent. The comparatively new earth cushion over the culvert had become, to all appearances, thoroughly consolidated and unrestricted running had been in force for a month.

The soil did not appear to be more than ordinarily soluble and was mixed with laterite. If the earthwork had been submerged it is possible that dissolution may have occurred under the track which would not be apparent until a train had passed over it but the evidence was vague as regards the height to which the water stood on each side of the line.

In all probability the track became spongy over the short length of new earthwork, owing to the very heavy rain and the consequent sharp depression of the track under the load of the engine and first four wagons caused the derailment of the fifth and subsequent vehicles.

The track probably looked normal to an approaching train.

There is ample evidence to show that the statement of Benoo, Wrenchman, is false and that he failed to patrol his section on the morning of the accident. He is therefore guilty of a breach of General Rule 200 (1) and (2). Had he patrolled this section conscientiously I am convinced that some defect would have been apparent to an observer passing over the side on foot and the accident could have been averted.

I therefore hold him primarily responsible for the accident.

I consider that Appulswamy, Mistry for Gang No. 8 is not without blame in that he should have made sure that his Wrenchman went out on patrol on this particular morning, in view of the heavy rain that had occurred in the early morning and the universally understood local orders on the subject of patrolling after rain.

General.

Transhipment and comfort of passengers were well arranged for and prompt measures were taken to restore through traffic which was resumed at 16 hours on the following day.

Considering the difficulty in obtaining labour, the climatic conditions and the fact that a small diversion was necessary, this was a very creditable performance.

Damage to Rolling Stock is about Rs. 11,000 and damage to Permanent way including cost of repairs is about Rs. 1,000.

Recommendations.

(1) That the importance of patrolling the line after heavy rain be impressed on all concerned and it should be emphasized that the rules refer to heavy rain at any time and not merely in the monsoon season when special regular patrols are usually arranged for.

(2) That severe penalties be imposed for non-compliance with these rules.

(3) That some form of check be instituted to ensure that the patrols are actually carried out.

At present it appears that only an accident will bring any such irregularities to light.

3. EAST INDIAN RAILWAY.

A DOWN LIGHT ENGINE RUNNING INTO A MOTOR CAR AT LEVEL CROSSING GATE No. 18, MILE 13, BETWEEN MONIRAMPORE AND BEGUMPUR ON THE 17TH APRIL 1932.

FROM MR. R. H. IRANI, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1041 XIII/32, DATED THE 27TH JUNE 1932. (4219-T.)

I beg to submit proceedings of a joint enquiry into the above accident held on the 21st April 1932.

The approaches to the Level Crossing are in places on a grade as steep as 1 in 15. The foot of the ramp on the north side where the car was said to be waiting for the gates to be opened, is about 6 feet below rail level.

The gatekeeper has disappeared and unless he is caught and his evidence taken the reason for his opening the gates when the engine was so close on him cannot be given satisfactorily. But the reason of his absconding is most probably due to the fact that he did not have the gate lamps burning and omitted to see the approaching light on the rest van. He also could probably not hear the noise of the approaching engine from a distance owing to the weather being windy and the light running of the engine.

Apart from the mistake of the gatekeeper opening the gates when he should not have, the engine driver is evidently guilty in that he ran tender foremost pushing the van, especially during the dark hours without any authority. According to the guard's statement he was in such a hurry to get away to Howrah, that it is thought he must be running at a speed much higher than 15 miles per hour; this is corroborated not only by some of the Station Masters but by the fact that he travelled no less than 600 feet after colliding with the car, whereas he could have easily stopped withing 150 to 200 feet if he, as he says, applied the brake immediately after the collision.

He has evidently given several false statements in order to protect himself; and his statement along with those of his two firemen as regards whistle having been blown before approaching the Level Crossing cannot be believed in face of the evidences given against it by some of the disinterested parties. Had he whistled before nearing the Level Crossing the gateman would in all probability have held up the car.

The driver's behaviour also after the accident would appear to be most inhuman. The result of his prosecution by the Police under Section 101 of the Railway Act is awaited.

I also consider the two firemen who have deliberately given misstatements of facts following those of the driver, deserving of exemplary punishment for doing so.

The guard of the ballast train and the switchman of Sakhtighar have already been dealt with by the Agent for their fault in not taking step to prevent the driver pushing the rest van onto Howrah.

PROCEEDINGS OF AN OFFICIAL COMMITTEE HELD AT BEGUMPUR ON THE 21ST APRIL 1932 TO ENQUIRE INTO THE PARTICULARS OF AN ACCIDENT WHICH OCCURRED AT LEVEL CROSSING ON THE 17TH APRIL 1932, GATE No. 18, BETWEEN MANIRAMPUR AND BEGUMPUR.

Precis.

On 17th April 1932 at about 20 hours Down Light Engine No. 541 " C. A. " Class—not fitted with Electric Head Lights running Tender foremost and pushing a Rest Van (covered Goods Brakevan No. 574, Type " G. T.") ran into a motor car carrying 6 passengers including the driver, (Chevrolet Car No. 28792—Owner Nilratan Ganguly of Janai, District Hooghly) at level-crossing No. 18 (Class " B " level-Crossing with one Gateman-in-charge) between Manirampur and Begumpur stations on Howrah Burdwan Chord Line—mile 13/17, where the District Board Road from Serampore to Janai crosses the Railway Line with the result that three persons, Kanai Das, aged 17 years of Begumpur, Pravash Kumar Sircar (*alias* Bang), the driver of the motor car, aged 22 years of Begumpur, and Gour Mohan Chatterjee, aged 26 years of Sheoraphuli were killed and three others—Tarapada Dutt, aged 26 years of Begumpur, Noyan Tara Laha aged 32 years of Begumpur and Nitai Charan Ash aged 26 years of Begumpur were injured. Of the three injured, Tarapada Dutt received serious injuries and he expired on the afternoon of 18th April 1932. The injuries to Noyan Tara Laha are of a simple nature, while Nitai Charan Ash received very slight injuries. The injury reports submitted by Sub-Assistant Surgeon, Kamarkundu, East Indian Railway, and District Medical Officer, Lillooah, are enclosed as documents attached to the proceedings of the enquiry.

The motor car was entirely smashed up. After it was run into it got entangled with the Buffers of the Rest Van and dragged about 185 yards from the level crossing till the engine came to a stand.

	Rs.
Cost of damages to rolling stock (Covered Goods Brakevan No. 574 Type " G. T.")	50
Cost of damages to locomotive	*Nil.*
Cost of damages to permanent-way	*Nil.*

Finding.

We, the undersigned, having carefully considered all the evidence, do find that the responsibility for this accident centres round the question of the light exhibited on the Rest Van attached to and being propelled by the engine. If there were no lights, or improperly exposed lights, then the Gateman would have no warning or insufficient warning of the approach of the train and in that case responsibility would not rest with him. The fact that he has absconded would appear to indicate that he might have noticed the light of the train, but only after he had opened the gate and too late to avert the accident. There may be other reasons to account for his flight and in the absence of his evidence it is difficult to arrive at a definite conclusion as regards the responsibility of the Gateman Dil Bahadur. His absconding, however, would appear to be a confession of his negligence.

The absence of the lights on the Rest Van would fit the responsibility on the driver, mitigated only by the possibility of the lights having been extinguished by the high wind. There is the statement of S. D. Rahman, Assistant Station Master, Manirampur, that when the engine passed his station a white light was showing in front of the Rest Van. The evidence of the two occupants of the car

and an eye witness of the collision is to the effect that there was no light, in the Rest Van but this does not falsify the statement of S. D. Rahman of Manirampur as the light may have been blown out after passing that station. It may be pointed out that there is evidence to the effect that a high wind was blowing when the Light engine passed Manirampur and a storm was impending.

Driver, Rahmatullah states he left Saktigarh with one side lamp of the Rest Van burning and shewing a white light, and an Engine buffer lamp also alight and shewing a white light, hung on the Draw Bar Hook. This combination of lights is not authorised and was devised by himself to meet his unauthorised action in pushing a vehicle in front of his engine. The lighting of both side lamps would have been a safer procedure as it would have ensured the condition of the lights being known to the engine crew, as these lamps shew a light in both directions. An engine Buffer lamp, in a smashed condition was found amongst the car wreckage and may be taken as proof that this lamp was suspended from the Rest Van Draw Bar Hook, but there was no evidence to support his statement regarding the side light. An examination of the left hand side lamp of the Rest Van showed no trace of any ash or soot as evidence of a burner burning there. We, therefore, consider, that driver Rahamatullah contributed to the accident by running without proper Head lights. He is also responsible for the following irregularities :—

(1) Leaving Saktigarh with a vehicle in front of his engine (Tender).

(2) Failing to stop at Begumpur and notify the accident so that assistance could be obtained for the injured and attention to the dead bodies. His explanation of this is absolutely untenable.

(3) Running at excessive speed between Saktigarh and Chandanpur. His speed dropped to about 23 miles below Chandanpur and was the probable rate when the accident happened.

By running the vehicles ahead of his Tender Driver Rahamatullah was accepting a considerable risk as, aside from the risk of derailment, his view ahead from the normal driving position of the Footplate would be completely obscured and the track ahead could only be seen by leaning well out from the Cab. It is, however, doubtful whether with the engine propelling a vehicle or running engine foremost or Tender foremost, the driver could have seen the obstruction and avoided the collision as the movement of a Car from the Gate on to the track would be a matter of seconds only.

In the evidence it is stated that the car Head lights were burning, in that case the beam would be thrown up and at right angles to the track (the beam would be up, owing to the sharp rise approaching the gate). The beam would, if showing, convey no warning to the driver as he would have assumed it was from a car waiting to cross-over, after the passage of his train. The view of the public road from an approaching Down train is obscured by low shrubs on an old brick kiln until very close to the Level Crossing.

Responsibility for the engine leaving Saktigarh pushing the Rest Van must be shared by others. The Switchman of the East Cabin, Saktigarh, should not have allowed this to happen. He states the Engine had passed his cabin before he noticed this but it is considered he could have thrown his Starting Signal to danger in time to stop the train and failing this he should have told Palla Road to stop the engine at his. Simply informing the Assistant Station Master, Palla Road, that the engine was running with a van in front was not enough. His statement that the Control was advised could not be accepted.

Engines should not be sent light at the whim of drivers and Section Controller, Bellgard, should not have permitted the movement until satisfied with the necessity for it. We accept that he was not informed that the engine was propelling a Rest Van.

The Ballast Train Guard G. B. Kelly also showed utter lack of initiative in allowing the driver to leave with his engine pushing the Rest Van. If the engine had already passed Saktigarh he could have still gone to either of the cabins and got in touch with Control and informed them what had happened.

The Power Superintendent has furnished a note to be attached to the finding from which it will be seen that there was no occasion for the engine to proceed to Howrah for repairs or for any other proper purpose.

(Sd.) G. WILSON,
Supdt./P.

(Sd.) G. W. SCRIVEN,
Supdt./W. & W.

(Sd.) N. C. GHOSH,
Supdt./T.

25th April 1932.
HOWRAH.

4. GREAT INDIAN PENINSULA RAILWAY.

No. 566 UP GOODS TRAIN RUNNING INTO A BULLOCK CART AT LEVEL-CROSSING No. 81, MILE 92/16-17, BETWEEN PADALI AND GHOTI ON THE 24TH APRIL 1932.

FROM MR. H. LAWTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 441, DATED THE 7TH MAY 1932. (4229-T.)

Description of Accident.

1. At 22-10* hours on 24th April 1932, at level-crossing No. 81 mile 92/16-17 north-east section, Great Indian Peninsula Railway, No. 566 Up Goods train (Up is westwards, towards Bombay) collided with a bullock cart crossing the line from south to north, *i.e.*, from No. 566 Up driver's left to right, at speed of about 35 miles per hour.

2. After the collision the driver of No. 566 Up put on the vacuum brake and came to a stand with the brake-van about 150 feet past the level-crossing the engine being about 1,700 feet past the level-crossing.

3. After the collision two bullocks were found between the Up and Down lines 84 feet from the level-crossing, one dead and one dying. Two men were found on the outside of the Up line 40 and 60 feet from the level-crossing, the former seriously injured and the latter dead. The shattered cart was found between the Up and Down lines 1,700 feet from the level-crossing, *i.e.*, about where the engine came to a stand.

4. Immediately after the collision the level-crossing gates were found to be open but the state of the gate fastenings apparently was not at that time seen by anyone except the gateman.

5. The engine No. 794 H/2 on No. 566 Up has not been fitted with an electric head-light.

6. No. 566 Up left the scene of the accident at 22-35 hours, taking the injured man to the Hospital at Igatpuri for treatment.

Description of Locality of Accident.

7. The level-crossing is at ground level on a stretch of straight, extending up to about half a mile on the east (from which side No. 566 Up approached) and up to about a quarter of a mile on the west. 1,520 feet east of the level-crossing is a summit from which the line falls 1/200 to just short of the level-crossing, beyond the summit the line falls 1/200 to a dip at about the end of the half-mile straight, so that the summit somewhat masks the level-crossing from an Up train at the far end of the half-mile straight.

8. The south approach to the level-crossing is also somewhat masked from an approaching Up train partly by the side of the cutting at the summit and partly by the gate-lodge and a ganghut.

9. The level-crossing is for a katcha road from a big road on the south side of the Railway to a village on the north side. The level-crossing has wooden gates with chain and padlock fastenings ; but no gate-lamps. There is a gateman posted there. On both sides of this level-crossing there is fencing.

10. One fastening chain had plain chain link ends through which the padlock in use would not go, and the other fastening chain had one plain end through which the padlock in use would go and a big stout split link at the other end. The three plain chain ends had each been given a big link made of several strands of wire about $\frac{4}{16}$ inch diameter (similar to fencing wire strands) for the padlock to go through.

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* The Guard has stated that it was a dark night.

11. The morning after the accident, *i.e.*, on 25th April 1932 these two fastening chains were taken over by the Railway Police after making enquiry. Each then had a wire link broken open as if done with the aid of a blunt cutting instrument.

12. The gateman alleges that he examined that the gates were chained and padlocked at about 19-30 hours on the evening of 24th April 1932 and that to his knowledge no cart passed through the gates between that time and the collision and that after the collision he found that each chain had a wire link broken open thus freeing the gates. He showed at site how each chain had been put on and the position of the wire links and padlocks, according to him the chain with links through which the padlock could go was on the south gate which is the side from which the cart in the collision approached the level-crossing.

5. MYSORE RAILWAYS.

DERAILMENT OF No. 32 DOWN MIXED TRAIN AT MILE 78/8-9 BETWEEN DODJALA AND DEVANHALLI ON THE 13TH MAY 1932.

FROM MR. A. E. B. SULLEN, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 7, BANGALORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. M. 32/7, DATED THE 20TH MAY 1932. (4254-T.)

In accordance with rule 7 of Railway Board's Notification No. 1926-T. of 19th March 1930, I have the honour to submit my report of the enquiry held by me at Devanhalli on the 16th May 1932 into the circumstances of the above accident.

2. The following officers attended the enquiry :—

Mr. Y. K. Ramachandra Rao, Superintendent, Way and Works.

Mr. H. Rangachar, District Traffic Superintendent.

Mr. M. Cheluve Urs, Locomotive Superintendent-in-charge.

Mr. K. V. Anantharaman, District Magistrate.

Mr. R. Muthogi Rao Sindhe, Acting District Superintendent of Police Railways and Criminal Investigation Department.

Description of the Accident.

3. On the 13th May 1932, No. 32 Down Mixed which was running five minutes late derailed at 9-49 hours at mile 78/8-9 between Dodjala and Devanhalli stations on the narrow gauge system of the Mysore Railways. The composition of the train was as follows :—

		Tons.
Engine E class 4-6-2. Total weight Engine and Tender		52
(i) C. G. No. 81 full load	8	
(ii) C. G. No. 60 Road Van	8	
(iii) C. G. No. 47 Road Van	8	
(iv) C. G. No. 2 Road Van	8	49
(v) C. G. No. 56 Road Van	8	
(vi) C. G. No. 72 Load	9	
(vii) Third Class Bogie Brake	12	
(viii) Bogie Luggage and Third Class Brake	12	
(ix) Third Class Bogie	12	66
(x) First, Second and Third, Bogie	12	
(xi) Bogie Luggage, Postal and Third Class . . .	18	
TOTAL . ..		167

4. The six leading four wheeled covered goods wagons and a bogie third (vii) capsized and the next bogie (viii) derailed, the remainder of the train did not leave the rails. The third class bogie (vii) immediately in rear of the covered goods wagons telescoped and it was in this vehicle that three passengers were killed and ten injured, one of the injured subsequently succumbed to his injuries, making a total of 4 killed and 9 injured to date.

5. There was no delay in reporting the accident.

6. Medical assistance was promptly rendered by the Sub-Assistant Surgeon from Devanhalli which is about a mile and a half from the site of the accident. A good metalled road runs parallel to the line here, so it was possible with the aid of the Police to clear the injured by one of the buses plying for hire on the road. The injured were conveyed by bus to the Local Fund dispensary ward at Devanhalli, where they were further attended to and left for their homes very shortly after. Thanks are due to Mr. Renu, Assistant Surgeon of the State, who was travelling by 32 Down, for rendering every assistance.

7. The damage to permanent way is approximately Rs. 500 and to rolling stock Rs. 17,500.

8. Through running was restored on the 15th May at 17-50 hours.

Description of the locality.

9. The accident occurred on an 8 foot embankment on a straight road and on the level immediately after a down grade of 1 in 100.

10. The permanent way consists of 41¼ lb. rails, 23′-9½″ long, supported on 9 steel trough sleepers per rail, earth ballasted.

11. The morning of the accident was bright and clear ; there had been no rain for some days.

Finding.

12. I visited the site of the accident in company with the Agent on the date of its occurrence, and after a careful examination could find nothing wrong with the road which had not been interfered with. I was unable to gauge the wheels on this date but did so on the date of the enquiry and found nothing seriously amiss except a few cases of tight wheel gauge, these being probably due to the severe buffetting the covered goods wagons had received.

13. From the evidence and examination of the road and wreckage it is not possible to say definitely what actually caused the accident. I have remarked in para. 12 that there were no defects in the permanent way, nor were the tight wheel gauges (even if these existed before the accident) likely to cause a derailment. There can be no question of obstructions on the line, as the engine did not derail. Excessive speed can, I think, be ruled out. The Sub-Way Inspector (Witness No. 3) was riding on the engine footplate and I am inclined to accept his estimate of the speed as 20 miles per hour ; this is supported by witnesses Nos. (4) and (6). Further, I do not think any driver in his proper senses would attempt to race a non-vacuum train with two fairly busy level-crossings ahead of him and the station but a short distance away.

14. There remains the question of sudden brake application by the driver, which in the case of a train marshalled as 32 Down Mixed was, with 6 four-wheelers immediately behind the engine, followed by 5 bogie vehicles might result in the derailment of light or unevenly loaded four-wheelers, but there was no evidence to support this.

15. I am inclined to believe that the failure of the running gear of the leading wheels of C. G. No. 72 (vi) was the cause of the accident, but what part of this gear was the first to give way it is difficult to say. The right axle box of the leading pair of wheels was picked up in pieces ; this was noticed by witness No. (6), a student, who happened to be looking out of the train. The right leading axle guards were found in the cess on the right of the line 188 feet from the marks of derailment, the leading wheels had rolled off the line to the left and were buried in slime 260 feet from the derailment whilst the wagon itself capsized at about 370 feet from the derailment marks. I do not think that the failure of the axle box and wheel guard could have been caused by the derailment.

16. What I presume must have happened is that C. G. 72 (vi) having lost its leading wheels, pulled C. G. 56 (v) off the track. The driver (witness No. 1) states that on seeing the wheels of C. G. 72 (vi) leaving the track he applied his brakes. This sudden application of brakes together with the pull exerted by the derailed wagons probably caused the remaining wagons to " bunch " and derail.

Recommendations.

17. It is suggested as desirable :—

(i) That every effort be made to fit vacuum brakes to all passenger vehicles.

(ii) That First Aid boxes be fitted to all brakevans of passenger trains.

6. GREAT INDIAN PENINSULA RAILWAY.

DERAILMENT OF No. 752 UP GOODS TRAIN AT MILE 554/23 BETWEEN BORDHAI AND JAMBARA ON THE 24TH JUNE 1932.

FROM MR. R. H. IRANI, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 55, DATED THE 14TH JANUARY 1933. (4477-T.)

In accordance with Railway Board's Notification No. 1926-T., dated 19th March 1930, I beg to submit the following report on the above accident.

Description of Accident.

2. No. 752 Up *ex*-Parasia to Amla, consisting of 30 loaded wagons and brake van fully vacuumed had 14 vehicles derailed at mile 554/23, at 14-10 hours on 24th June 1932. All the derailed wagons were immediately next to the engine, the first eleven of which were telescoped and capsized and the following three vehicles derailed; the track was destroyed for a length of 340 feet and the 11 wagons were badly damaged, the cost of damage to track and rolling stock being Rs. 2,195 and Rs. 26,694 respectively. Through communication was restored at 18 hours on 25th June 1932 by means of a diversion.

Description of Locality and Train.

3. The line is on a down gradient of 1 in 150 for a mile behind the site of the accident. The line is straight and was found to be in good condition where the wheels first came off the rail. This point is about 1,000 feet from the site of accident and the track from this point to the site of accident had the tie bars of the pot sleepers cut up by the derailed wheel. An axle guard tie rod was found, lying at the spot of first derailment and on detailed examination of the derailed wagons the 2nd vehicles from the engine which was E. I. Railway C. W. 46790, was found to have its right hand journal twisted off, its journal and axle box being found in the vicinity where the wagons telescoped and the waste inside the axle box, when examined after the accident, was found to be still smouldering.

History of wagon No. 46790 E. I. Railway.

4. The lifting date of this vehicle is 29th November 1930 LLH, repacking date is 31st December 1931 Gaya and the date of oiling is 15th June 1932 Ajni. This wagon arrived at Ajni from B. N. Railway by 190 Up Goods on 11th June 1932 loaded *ex*-Raipur for Nagpur. On arrival of the wagon it was examined by the Neutral Train Examiner and the axle box of the journal in question was treated as a rivetted box. This wagon again left Ajni by 520 Up as an empty for Amla on 16th June 1932 and was oiled by the carriage staff at Ajni on 15th June 1932.

5. There is no doubt that the cause of the derailment is the axle of the above wagon running hot and twisting. The cause of the axle running hot must however be " old packing " and " insufficient lubrication."

6. The question whether the hot axle could not be discovered on the run by the staff concerned, has been investigated. The train ran through Hirdagarh, Nawegaon and Bordhai before the accident took place. The Station Masters of these three stations were present on the platform to pass this train. The hot axle was on the right of the train and a high wind was blowing across the train from left to right; the Station Masters of Nawegaon and Bordhai stations whose platforms are on the left of the train could therefore not discover the hot box, and

the Station Master of Hirdagarh whose platform is on the right hand side could however have seen the hot box, but as it was the first station to pass through, it is very likely the hot axle had not developed at the time. The attention of the trains staff was also not attracted by the hot axle due to the weather conditions as stated above.

7. NORTH WESTERN RAILWAY.

No. 4 DOWN FRONTIER MAIL RUNNING INTO A MOTOR LORRY AT LEVEL-CROSSING No. 48, MILE 601/2, BETWEEN NOWSHERA THANA AND PIR PIAI ON THE 22ND JULY 1932.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 37-T/32, DATED THE 10TH AUGUST 1932. (4309-T.)

I held my enquiry on August 3rd at Nowshera station. The following were present :—Lt.-Col. H. L. Woodhouse, Divisional Superintendent, North Western Railway, and his Divisional Officers concerned ; Captain Sikander Mirza, the Assistant District Magistrate, Nowshera, a representative of the Railway Police, North-West Frontier Province, and a legal representative of some of the killed.

Description of the site and conditions of the Accident.

2. The accident occurred at level-crossing No. 48, mile 601/2, between Nowshera Thana and Pir Piai stations of the Nowshera-Peshawar section of the North Western Railway main line.

3. Level-crossing No. 48 is an " A " class crossing of the Grand Trunk Road between Nowshera and Peshawar on the North Western Railway main line. There is a considerable traffic on the road during the day but little during the night. The gates are four 9-feet leaves working independently of each other, fitted with two lights and 2 large discs painted red, one on each side of the crossing. The gates are manned by 2 gatemen, each on duty for 8 hours in alternate shifts. The gates open inwards towards the track but when fully open are 7′-6″ clear of the centre of the track.

4. The Road and Railway approach the crossing running parallel to each other for some considerable distance. At the crossing, the road swings over and crosses the railway square with two sharp right angle approach curves. A re-alignment of the road is under construction at present to ease the sharp curves and make a more skew crossing. The Railway approaches from both sides are long clear straights with nothing to obstruct the view.

5. There are road signs indicating the road approach to the level-crossing and the weather was clear with bright sunlight when the accident occurred at 9-20 hours.

6. The lorry was occupied by 19 people including the Driver and cleaner of the lorry and was travelling from the direction of Peshawar to Nowshera. The train was the Down Frontier Mail travelling at an estimated speed of 38 miles per hour on an approaching rising grade of 1 in 193/313 with double engines and double brake-vans.

Description of the Accident.

7. When the accident occurred the lorry was standing on the roadway astride the track. The gate on the Nowshera side was admittedly locked ; the gate on the Peshawar side was open, having either been forced by the lorry or left open by the gateman.

8. The leading engine of the mail struck the lorry square, carried it about 125 feet and flung it to one side of a low bank. The train came to a stand with the rear vehicle about 60 feet clear of the crossing. The cowcatcher of the leading engine was bent slightly.

9. Of the 19 people on the lorry, 3 were killed instantly and 6 were seriously injured. The three dead bodies were left at the level-crossing in charge of the police travelling with the train and the 6 injured were rendered first aid by the railway staff and passengers with the help of the First Aid Box in the Guard's Brake-van. The six injured, after receiving attention, were placed in the train

with all the care possible and the train proceeded to Nowshera station. At Nowshera the Railway Sub-Assistant Surgeon took over the injured and with the help of the Station Master on duty conveyed them under his personal charge to the Civil Hospital, Nowshera. Of the 6 injured, 2 have since died and the remainder are reported to be receiving suitable attention.

The Evidence.

10. The evidence taken and attached consists of :—

(*a*) the evidence of 5 eye-witnesses of the accident, one the gateman and four wayfarers who are non-railway employees and made their statements on oath to the Additional District Magistrate ;

(*b*) the evidence of the train staff and other Railway personnel who inspected the site immediately or very soon after the accident.

Further I examined the site personally and with particular care the broken leaf of the level-crossing gate and the smashed lorry.

11. Finally, the legal adviser to some of the killed and injured and a voluble but distant relation of the dead lorry driver explained certain theories. The latter person, particularly at the site, explained how the evidence at the site proved that one gate was open and the lorry had driven through this open gate to draw up astride the track there to await the opening of the further gate when the accident occurred.

12. The facts established by all this evidence can be summarised briefly as follows :—

(1) The lorry came to a stand astride the track when 4 Down Mail was approaching and was too near to enable the driver to take notice of the obstruction and pull up his train.

(2) The gate on the Nowshera side and nearer to the gate lodge was closed and locked.

(3) The gate on the Peshawar side was open or partly open. The Nowshera leaf of this gate was partly broken and twisted.

(4) The shackle of the Nowshera leaf which is thrown over the post of the Peshawar leaf to close the gates had been torn from its position.

(5) This shackle of the Nowshera leaf was found after the accident to be on the post of the Peshawar leaf indicating that the gates had been closed and the shackle of one leaf thrown over the post of the other leaf.

(6) The chain and lock of the gate were intact showing the gates had not been chained and locked.

(7) The lorry had been struck by 4 Down Mail while standing on the track, was badly smashed and there was a most regrettable list of casualties among the lorry passengers.

Conclusions.

13. There are in my opinion only two possible theories as to the causes as the accident :—

(1) That the gates were closed with one gate locked and the other with only the shackle thrown over the gate post with the gateman himself standing at this gate. This was in good time to pass the train. The lorry approaching at high speed saw the closed gates, tried to pull up and in any case did slow down but with its momentum pushed open the Peshawar gate inwards and came to a stand astride the track with the gate shackle of one leaf with its very flimsy holding torn off that leaf and hanging on the post of the other leaf. The train then struck the lorry which in its turn struck the open Nowshera gate leaf which was then at right angle to the track. This second blow to the gate leaf damaged it further and marked it with the yellow paint which was mentioned in the evidence. The lorry was carried on and later thrown down the bank.

(2) The second theory was that the Peshawar gate was fully open but the Nowshera gate was closed and locked. The lorry driver seeing neo gate open drove on to the track to await the opening of the other gate and while so waiting was struck by the train, the damages to the gate leaf with its yellow paint mark from the body of the lorry being the result of the lorry striking the gate after the collision.

14. I give this second theory only because it was the one brought forward by the relations of the killed and injured at my enquiry. It gives no consideration to the vital fact that the shackle of the damaged gate leaf was torn out of its fastening and further assumes that this shackle was placed, on the post of the other gate leaf after the accident by some railway official to evade responsibility for the accident. No evidence was produced to show when and by whom this shackle was so placed, whereas there is strong evidence that it was found there immediately after the accident.

15. This second theory really expresses the desire to transfer responsibility for the accident from the lorry driver to the Railway, probably with the hope that damages can be obtained from the Railway and not from the lorry driver or owner. Even if this theory is accepted to represent what actually occurred, I still consider the lorry driver criminally foolish and wholly responsible for the accident and loss of life and injuries to his passengers.

(1) He could, at that time of day and under the existing circumstances, certainly see that the farther gate was closed and he could not get across the track.

(2) He had no business to suppose that the gates were being opened after the passage of a train and one gate had been opened and the other was to be opened. It was equally likely that the gates were being closed and one had been closed and the other was to be closed.

(3) A glance up and down the line with a clear view of the Railway for miles on either side before he brought his lorry on to the track would have shown him the approaching train.

(4) It was criminal folly on his part to bring his lorry to a stand across the track itself rather than short of the track and clear of it until he saw the further gate opened and a clear road before him.

16. I accept the theory enunciated first in paragraph 13 above and consider that both gates were closed with only the Nowshera one locked and that the lorry driver ran his lorry through the one gate unlocked but shackled and is wholly responsible for the accident.

Recommendations.

17. I have the following recommendations to make :—

(1) The gates at these " A " class level-crossings should open away from the Railway and not inwards towards it.

(2) The gates at least on each side should be coupled for " A " class crossings (*see* Standard specifications).

(3) Where chains and locks are provided for gates the gatemen should use them. In this case had the damaged gate been chained and locked, it would have simplified the enquiry even though it may not have stopped the lorry clear of the track as has been claimed it would have done. Gates are not meant to do this and act as pneumatic buffer.

(4) If the Administration when it provided the chain and lock intended that the gates should always be chained and locked for the passage of trains, then this gateman Kala should be punished departmentally for failing to do his duty. Further I would suggest the man's transfer to some other gate south of Attock and out of the Nowshera-Peshawar area.

MGIPC—M—X-6(PD)—19-6-33—500.

P. R. B.—R. A./13.

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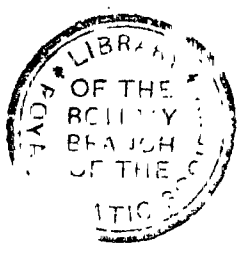

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1. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

"S.S. TUSCANIA" BOAT SPECIAL RUNNING INTO A TROLLY NEAR LAKHERI STATION ON THE 1ST NOVEMBER 1932.

FROM MR. R. H. IRANI, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 658, DATED THE 1ST MAY 1933. (4433-T.)

I beg to report that at 12-25 hours on 1st November 1932 the trolly of the Sub-Permanent Way Inspector Kapren collided with the Down "Tuscania" Boat Special at the North end of Lakheri station yard. There were three men besides the Sub-Permanent Way Inspector on the trolly. The Sub-Permanent Way Inspector, who helped in removing the trolly, was fatally injured and the other three trollymen escaped unhurt.

2. The line at the site of the accident is in a cutting on a curve limiting the view of an approaching train to about 660 ft. As soon as the Sub-Permanent Way Inspector saw the train he stopped the trolly, and after the trollymen had removed the body of the trolly he was removing the front wheels when he was knocked down by the train, just as he was clearing the track. He was found lying about 82 ft. from the point where he was struck and the second set of wheels was carried 250 ft. from the point of collision. The engine came to a stop at 1,260 ft. from where it collided with the trolly.

3. The Sub-Permanent Way Inspector had in his possession the notice of the special train running on the day. The train was however running 28 minutes late and it appears that he took the risk of getting through the cutting on the curve at the north end of Lakheri station in order to reach there and ask the Station Master whereabouts of the train.

4. In pushing his trolly through the cutting he omitted to send a trolyman ahead as required by rules. I consider that the Sub-Permanent Way Inspector is responsible for this accident in not taking measures to protect his trolly while he was aware that the Down Special was expected across this locality at any moment.

5. The speed at which the train was travelling before the accident is considered to be much higher than the restricted speed of 25 miles per hour as evidenced by the Station Master and by the distance (1,260 ft.) covered by the engine before it came to a stop after the collision. Had she been travelling at the restricted speed it is likely that the trolly would have been cleared from the track before the engine arrived at the spot.

6. The Deputy Station Master also omitted to exchange signals with the gateman before lowering the signals as required by Sub-Rule 37 (32). Had this been done the accident would have been avoided.

7. I understand disciplinary action has already been taken against the Deputy Station Master.

2. EASTERN BENGAL RAILWAY.

No. 4 DOWN ASSAM MAIL RUNNING INTO A BULLOCK CART AT MILE 239/3 BETWEEN BADARGANJ AND KHOLAHATI ON THE 4TH NOVEMBER 1932.

FROM RAI BAHADUR D. N. BATRA, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 454/1010 (67), DATED THE 3RD APRIL 1933. (4417-T.)

The Report is based on the Proceedings of the Eastern Bengal Railway Assistant Officers' Joint Enquiry held on the 15th and 25th November 1932 which has been accepted by me, and no further enquiry was considered necessary.

Description of the Accident.

2. At about 5-10 hours on the 4th November 1932, when 4 Down Assam Mail was passing " C " Class Level Crossing Gate No. 6 at mile 239/3 between Badarganj and Kholahati stations, it collided with a bullock cart, causing the death of the cartman and grievous injuries to the other occupant, from which the latter succumbed a few days later in the Parbatipur Railway Hospital. The Level Crossing is situated on a 2 degree curve. Although there are 3 trees near the gate lodge, the view is fairly clear. There are no gates provided at this Crossing but only gate posts with chains and is in charge of a Railway gateman. This Level Crossing is not lighted at night. The Mail Train Engine was running with Electric Head Light on.

Evidence.

3. From the evidence it transpires that the gateman was absent from his gate during the night and left the chains open. Owing to the curve, the Driver [illegible] the cart when it came up too near and tried to stop his train but it was too late to avert the accident.

Conclusion.

4. The Joint Committee considered both the gateman and the cartman jointly responsible and I agree entirely with this finding. The gateman was prosecuted by the Railway Police for negligence of duty under Section 101 Railway Act, and has been sentenced to 3 months' rigorous imprisonment. The cartman was either half asleep or did not look round. If he had done so he could not have missed the Head Light of the incoming Mail.

Recommendations.

5. To avoid repetition of such accidents, I have recommended to the Administration that all such " C " Class Level Crossings should either be locked against road traffic during the hours of darkness and should be fitted with proper lights or the chains should be removed and the Level Crossings should be re-classified as un-manned.

3. BURMA RAILWAYS.

DERAILMENT OF No. 346 DOWN GOODS TRAIN AT HTEIN-IN ON THE 11TH DECEMBER 1932.

FROM MR. E. C. WHELAN, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A, RANGOON, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 731/14-A, DATED THE 22ND DECEMBER 1932. (4448-T.)

I submit herewith a report of the enquiry held by me at Htein-in on 16th December 1932, into the circumstances attending the derailment of 346 Down Fast Goods train at Htein-in Station on the Rangoon-Mandalay Main Line at 12 hours on 11th December 1932.

The following Officers attended the enquiry :—

Mr. F. L. F. Boeddicker, District Locomotive Superintendent, Toungoo.

Mr. S. C. Bryant, District Traffic Superintendent, Toungoo.

Mr. E. Procter, District Engineer, Toungoo.

Description of the Accident.

The accident occurred at about 12 hours on 11th December 1932 in Htein-in Station on the Rangoon-Mandalay Main Line.

The train concerned was 346 Down Fast Goods which was running through this station and crossing up Ballast Train No. 34, when it parted and the leading eighteen wagons derailed and capsized.

One cattle attendant was killed and two injured. Four bulls were killed and one so badly injured that it had to be killed later.

The engine-tender rear axle and frame were bent and all of the derailed wagons badly damaged; some of them being completely smashed.

None of the engine crew or train staff was injured.

Description of Locality.

The accident occurred in Htein-in Station Yard which is on an up grade of 1 in 400 in the direction in which the train was travelling.

There is a down grade of 1 in 200 towards the station for half a mile on the north side followed by 1,000 ft. of level before entering station limits. On the south side of the station there is nearly a mile of 1 in 200 up grade in the direction of travel of the train.

The north end of the station yard is on a slight curve but there is a clear view for a considerable distance on either side of the station.

The track at site and in the vicinity is fully ballasted and in good condition.

Conclusions.

The derailment was due to the breakage of the tender draw-bar which caused the engine to accelerate rapidly, thereby breaking the vacuum pipe connection between the tender and the four leading vacuum vehicles of the train and momentarily get ahead of the train.

The speed of the train appears to have been not greater than ten miles per hour and the engine must therefore have come to a very sudden stop, with the result that the heavy following train collided with it, derailed and telescoped the first 18 wagons into it, the braking power of the four leading vacuum connected wagons being totally inadequate to pull up the train in the distance available and the guard and brakesman not having had sufficient warning of the parting to enable them to assist with their brakes.

The evidence shows that the draw-bar broke in the station yard; probably just after the line clear token had been picked up and the position of the vehicles and wreckage after the accident supports this.

There is no evidence to show why the draw-bar broke and an examination of the pieces recovered shows a perfectly clean flawless break, though the texture of the metal appears to be of a coarser chrystaline structure than one would expect to find in steel of the standard which this is reputed to be, *i.e.*, 40 tons per square inch standard draw-bar steel of $2\frac{1}{2}$ inches diameter. It broke in circumstances which afford no clue to the reason for the breakage.

The train, which was a heavy one of about 933 tons, had coasted slowly down half a mile of 1 in 200 grade onto a level stretch of one thousand feet and was still coasting up a 1 in 400 grade when " line clear " was picked up and the driver presumably opened out his throttle so as to negotiate the long rising grade of 1 in 200 ahead.

Even if he had suddenly opened out his throttle, he had a heavy following train and the strain on the draw-bar would probably have been much less than that due to starting from rest. This draw-bar is stated to have had a life of at least one hundred thousand miles and must have been subjected to the strain of hauling equally heavy loads, so that it is not apparent why it should have fractured in the present circumstances.

It is possible that a critical synchronization of coupling oscillations with draw-bar pull occurred, thereby causing considerably enhanced stresses but steel of this standard should have been capable of standing up to any such additional stress.

One is forced to the conclusion, therefore, that the steel may not be up to specification and the administration should have analytical and physical tests made from the broken pieces of the draw-bar and the fractured surface should be examined by the government metallurgist.

There are so many indeterminate factors that an attempt to calculate actual stresses would give misleading results.

I hold no body to blame for this accident nor were any irregularities in working detected.

General.

Through communication was restored at 23-15 hours on the same day by diverting the loop line clear of the debris.

The injured were promptly dealt with by despatching them by No. 34 Ballast Train to Pyinmana Hospital.

Difficulty was experienced in extracting the dead man as a crane was necessary to remove some of the wreckage before he could be reached.

The corpse was sent by Accident Special to Pyinmana as soon as it could be released.

Accident Specials were sent from Pyinmana and Toungoo.

The damage to Rolling Stock was approximately Rs. 24,350 and to Permanent Way Rs. 725.

Recommendations.

In view of the financial stringency I make no recommendations but wish to emphasize the fact that as long as non-vacuum and mixed trains are permitted to be run, such accidents as this are liable to occur.

4. ASSAM BENGAL RAILWAY.

No. 30 DOWN ASSAM MAIL RUNNING INTO A BULLOCK CART AT MILE 470/8-9 AT TITABAR ON THE 8TH JANUARY 1933.

FROM RAI BAHADUR D. N. BATRA, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 370/1010/66, DATED THE 15TH MARCH 1933. (4474-T.)

I submit below my report on the above accident.

2. The Report is based on the proceedings of an Assam Bengal Railway Joint Committee of Enquiry held on the 12th January 1933, which has been accepted by me, and no further enquiry was considered necessary.

3. The Officers comprising the Joint Enquiry Committee were Mr. W. P. Field, District Traffic Superintendent, Lumding, Mr. Q. Z. Husain, Acting District Engineer, Mariani, and Mr. P. N. Batra, Assistant Locomotive Superintendent, Mr. P. C. Baruah, Sub-Inspector of Government Railway Police was also present.

Description of the Accident.

4. At about 3-50 hours on the 8th January 1933 when 30 Down Mail was entering Titabar station, it ran into a bullock cart coming from Jorhat at the Level Crossing at mile 470/8-9. The bullock cart was smashed into bits. Out of 3 occupants of the cart one was thrown out in the waterway under the adjoining railway bridge and got killed and two seriously injured. There was no damage to the Permanent Way and a slight damage to the Left Injector Pipe of the engine.

Description of the Locality.

5. The Level Crossing at mile 470/8-9 (from Chittagong) on the Lumding-Mariani Section of the Assam Bengal Railway is a third class Level Crossing fitted with only check rails and blocks. There are no gates or gateman-in-charge. The approaches are on level and the view of trains from the road is fairly clear.

The line is straight for about 1,600 ft. on either side and is level towards Titabar station but from a point 100 ft. from the Level Crossing towards Tinsukia there is a rising grade of 1 in 500 stretching for about half a mile.

Evidence.

6. The night was dark and foggy and the visibility was poor. The Engine Electric Search Light was burning properly. The engine driver saw the cart about 3 rail lengths from the Level Crossing when he applied the brakes. The train was then travelling at 15 miles per hour. Owing to the poor visibility I am of opinion that the driver could not have seen the cart from a sufficiently long distance to enable him to stop his train, clear of the Level Crossing and thus avoid the accident.

7. From the statement given by the surviving cartman before the Police, it appears that his two companions were asleep in his cart and he must have dozed off when the accident took place. The cartman had neither any knowledge when he approached the Railway line nor he made any effort to get over the railway track quickly.

Remarks and Recommendations.

8. The Joint Committee has recommended that owing to heavy cart traffic across this Level Crossing on the Bazar days a gateman and gates should be provided. I agree with this and have recommended to the Agent, Assam Bengal Railway for early completion of this work.

5. SOUTH INDIAN RAILWAY.

No. 184 PASSENGER TRAIN RUNNING INTO BULLOCK CARTS AT MILE 199/18-19 BETWEEN LALGUDI AND BIKSHANDARKOIL ON THE 10TH JANUARY 1933.

FROM MR. G. C. LAUGHTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, BANGALORE, TO THE SECRETARY, RAILWAY BOARD, LETTER No. S.-33/9, DATED THE 23RD JANUARY 1933. (4470-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T. of 19th March 1930, I have the honour to submit herewith my report of the enquiry held by me into the circumstances attending the collision between No. 184 Local Shuttle train and a double bullock cart with another attached to it at level crossing No. 16, mile 199/18-19, on the Trichinopoly-Villupuram Chord, South Indian Railway, on 10th January 1933.

2. My enquiry was held at Lalgudi station on 16th January 1933, further evidence being taken at the Local Fund Hospital, Lalgudi, on the same date. The scene of the accident was also inspected both in day-light and after dark.

3. The following officers attended the enquiry on 16th January 1933 :—

R. Beveridge, Esq., District Engineer, South Indian Railway, Trichinopoly.

Sidney Smith, Esq., District Traffic Superintendent, South Indian Railway, Trichinopoly.

J. F. Wright, Esq., Acting District Mechanical Engineer, South Indian Railway, Villupuram.

N. S. Narayanasamy Iyer, Esq., Inspector, Railway Police, Trichinopoly.

Description of the Accident.

4. On 10th January 1933 at about 22-0 hours No. 184 Local Shuttle passenger train drawn by engine No.M.T.-4, 4-6-4 T type, running bunker first, with a load of 7 coaching bogies, approximately 114 tons, all vacuum braked, running between Trichinopoly and Lalgudi, collided with a bullock cart drawn by two bullocks to which another cart was attached at level crossing No. 16 at mile 199/18-19 between Bikshandarkoil and Lalgudi stations. The collision resulted in serious injury to 3 men travelling in the carts one of whom subsequently died, a fourth man escaped uninjured. One bullock was killed, the other escaped, one cart was smashed completely, the other only sustained minor damage. The train staff and passengers suffered no injury and there was no damage to railway property. The damage to private property is estimated at approximately Rs. 110.

5. First aid to the injured was rendered by the train staff and they were taken by the same train to the Local Fund Hospital at Lalgudi, a distance of 5 miles, one as mentioned above expiring on the way.

6. The collision did not result in the line being blocked and the only detention to traffic was one of 24 minutes to the train involved.

7. The train was running approximately right time.

8. The weather was fine with a bright practically full moon and a strongish breeze from the east.

9. The engine was not fitted with an Electric Head Light.

Description of the Locality of the Accident.

10. The site of the collision was level crossing No. 16 at mile 199/18-19, Villupuram-Trichinopoly chord, roughly 1½ miles east of Bikshandarkoil station from which the train approached and 5 miles west of Lalgudi station.

The line runs here approximately east and west. The level crossing is B class and carries a metalled District Board road which crosses at a skew of about 30° north-east to south-west. Single 18 ft. gates are provided which shut across the road but not across the line. They are each fitted with a gate lamp showing red and white, the lamp on the north gate is fitted in the centre of and slightly above that gate, while the lamp on the south gate is fitted on the hinge post 9 ft. 6 ins. above rail level and works with that gate. The gates are not coupled. The lamps are removable but are so constructed that they cannot be wrongly fitted and they give a red indication to the line when the gates are open for road traffic and a white indication when closed, the converse indications being given in each case to the road.

11. The gate lodge is situated close to the line west of the north gate and completely masks the lamp on that gate to trains approaching from the west. The lamp on the south gate is visible from Bikshandarkoil station about $1\frac{1}{2}$ miles away (this was ascertained by an actual test on the night of 16th January 1933).

12. The line is straight for over 2 miles towards the west and for about $\frac{1}{2}$ a mile towards the east. It is level over the crossing and the nearest grades on either side are 1 in 1,000. The roadway is level for about 20 ft. on either side of the centre of track and then slopes down on either side with easy gradients of about 1 in 40.

13. There are two gate-keepers provided at the crossing who work in 12 hour shifts, the man concerned had been on duty 4 hours at the time of the accident after 12 hours rest.

Summary of Evidence.

14. Driver Desmier states that he saw the south gate light showing white and also whistled as he approached at a distance of about 7-8 telegraph posts (about $\frac{1}{3}$ mile). He considers that after he had seen the light the gate-keeper must have opened the gates and allowed the cart on to the crossing. He was quite familiar with the road and the level crossing. His first fireman, Spring, corroborates his evidence and states that he was looking out all the time from the moment the driver whistled until the accident happened but did not notice whether the gate light remained white throughout that period. The second fireman also states he saw the gate light white, but did not watch it up to the time of the accident.

15. Both the driver and his first fireman state that the gate-keeper was present and had his hand signal light lit, but gave no danger signal. The guard however denies this and states the gate-keeper had no lamp. As however he failed to observe the position of the gates after the accident, too much importance should not be attached to his testimony.

16. The gate-keeper who gave his evidence very clearly states that though his practice is to keep his gates closed at night to road traffic except when necessary to open them to allow such traffic to pass, on the night in question on account of heavy road traffic (due to the Pongal festival) he opened them after the previous train had passed at 21-0 hours and did not close them again. He states he heard no whistle from No. 184 (probably due to the strong breeze from the east) but eventually heard its rumbling and saw a red engine head-light, while at the same time the bullock carts came on to the crossing, and though he shouted to the cartmen, they were apparently asleep and he was powerless to prevent the accident. He states the carts were moving at the moment of impact (*i.e.*, they had not stuck on the crossing), and his gate lamps were burning, and he showed a danger signal. The evidence of the two injured men which was taken in hospital, where they were still suffering from their injuries and shock, throws no further light on the subject.

Conclusions.

17. There is a distinct conflict of evidence between that of the engine crew and that of the gate-keeper. The former say the gate signal was showing white, *i.e.*, gate closed, when they saw it at a distance of about $\frac{1}{3}$ mile, the

latter states the gate had not been closed for an hour and would therefore have been showing red. The fact remains that the carts were struck on the level crossing and therefore the gate must have been open to allow them to get there, and therefore the light must have been red at some time during the train's approach and must also have been red at the moment of collision in order to allow the leading cart of two to be on the track, and it was the leading cart that was struck with consequent demolition of it, killing of one bullock and injuries to the two men in it (one of whom died), the trailing cart though thrown off the track was only slightly damaged, while of its occupants one only was injured and the other escaped unharmed. If the driver's theory is to be accepted it means that at the speed he was travelling, say 30 miles per hour, there was about 40 seconds to the gate-keeper to open the gate and for the cart to get on to the track with its occupants probably fast asleep. This is possible but highly improbable. At any rate it would mean that the gate signal must have changed from white to red and the driver and his first fireman, who was also looking out, failed to observe the change. From actual observation I found that the gate signal is clearly visible at night from Bikshandarkoil station 1½ miles away and it is conceivable that the driver noticed it showing white when he started out of that station and probably did not worry to observe it further. If this were so there would be ample time for the gate-keeper to have opened the gates and for the carts to get on to the crossing.

These points are however matters of surmise, but the fact remains that at the time of collision the gate must have been open and the gate lamp showed red and I therefore hold Driver Desmier, and in a lesser degree fireman Spring responsible for the accident, in that they failed to observe and act upon a danger signal in contravention of General Rules 7 and 122. It must be said however as an extenuating circumstance that had an Electric Head Light been fitted to the engine, which is modern standard practice on at least all engines of passenger trains, the accident would probably not have happened, as firstly the gate-keeper would have had ample warning of the approach of the train on the 2 miles straight stretch to the west including the halt in Bikshandarkoil station, and not had to rely on his hearing, and secondly the driver himself could have seen that the gate was open sometimes before he reached it.

Recommendations.

18. Though in the present period of depression one is reluctant to recommend anything involving additional expenditure, the policy of fitting Electric Head Lights to locomotives working mail, passenger and mixed trains as a safety measure is no new one, and one that has been adopted throughout most railways in India. It is recommended therefore that the completion of the fitting of Electric Head Lights to all engines working trains containing passengers, be expedited on the South Indian Railway.

6. HOWRAH-AMTA LIGHT RAILWAY.

No. 51 UP MIXED TRAIN RUNNING INTO A BULLOCK CART OUTSIDE THE UP OUTER SIGNAL OF SITAPURHAT STATION ON THE 31ST JANUARY 1933.

FROM MR. A. I. SLEIGH, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 343/XIII/33, DATED THE 27TH FEBRUARY 1933. (4486-T.)

At about 9-15 P.M. No. 51 Up Mixed train ran into a bullock cart which was crossing the line over the level crossing just outside the up outer signal of Sitapurhat station. The driver of the bullock cart was killed instantaneously and one of the bullocks was injured and subsequently died.

51 Up Mixed left the previous station right time.

Finding.

The following questions arise:—

(i) was the train being driven at excessive speed?

(ii) did the driver approach the level crossing with due caution?

(iii) was the deceased cartman on the alert?

2. The answers to these questions are:—

(i) the train had left the previous station right time and, as the running speed between stations at night is 12 miles per hour, there was no necessity for the driver to exceed this speed. The train was booked to stop at Sitapurhat station distant about 800 ft. from the level crossing; the normal way of stopping a train is by applying the brakes on the engine hence the driver had to have his train under control. I am of the opinion then that the train was not being driven at excessive speed, on the contrary I consider that the normal speed was about to be, or had been, reduced when the accident took place;

(ii) the evidence shows that the driver complied with the instruction given on the whistle board (distant about 500 ft. from the level crossing) to whistle and, as I have already stated, the train was being driven at slow speed;

(iii) apparently not, as the railway line is on the straight and he should have heard the train coming and, if fully on the alert, should have seen the lights of the engine and train inspite of there being a considerable amount of undergrowth between the road and the railway line. The evidence seems to show that the driver was asleep for the natural thing for him to have done, if he had seen that the train was about to collide with his cart, would have been to have saved himself.

My *finding* is that the cause of the cartman being killed and damage being done to a bullock and the cart was due to the cartman's own negligence and I do not hold the driver responsible in any way.

MGIPC—L—X-18—4-7-33—500.

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1.—BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Derailment of No. 301 Up Goods train between Patalpani and Kalakhund on the 26th January 1933.

From Mr. R. H. Irani, Senior Government Inspector of Railways, Circle No. 5, Bombay, to the Secretary, Railway Board, letter No. 666, dated the 3rd May 1933 (4482-T.).

In accordance with paragraph 9 (1) of Railway Board's Notification No. 1926-T., dated the 19th March 1930, I beg to submit the following report on the circumstances leading to the above accident on the Ajmer-Khandwa Section of the Bombay, Baroda and Central India Railway (Metre Gauge).

2. *Description of accident.*—On 26th January 1933, 301 Up Goods left Patalpani at 5-15 hours for Kalakhund which is a Ghat section on the down grade. From Patalpani the Ghat staff took charge of the train and proceeded to the Test Incline where the train ordinarily stops to ensure that it is under control. From there she proceeded downhill towards Kalakhund and just after passing through tunnel No. 4 jerks were experienced by the train staff and the train soon after stopped at mile 326. Sixteen of the vehicles in the middle of the rake were found to have derailed, most of them having capsized and telescoped causing heavy damage to the rolling stock to the extent of about Rs. 50,000 and slight damage to the track costing about Rs. 500. Through communication was restored on the morning of 28th January 1933, the transhipment of passengers having taken place during the interval.

3. *Description of locality and train.*—Patalpani station at mile 323 is at the top of the Ghats, from where the line descends on 1 in 40 grade for $\frac{1}{2}$ mile, at the bottom of which there is a "Test Incline Catch Siding" where all up (descending) trains stop till they are signalled to proceed. The descending gradient of 1 in 40 continues upto mile $326\frac{3}{4}$, $\frac{3}{4}$ mile beyond the site of accident.

4. At the exit (south end) of tunnel No. 4 a curve (right handed) of 660 feet radius commences followed by a straight portion of about 70 feet in length, after which there is another flat curve of 2,200 feet radius (left handed). The derailment marks were seen commencing from the exit of the tunnel No. 4 and the derailed vehicle or vehicles were dragged for a distance of 920 feet before they capsized on the flat curve of 2,200 feet radius. From the exit of the tunnel No. 4 to the site of the accident the line is in a cutting 10 to 20 feet deep.

5. The track consists of 50 lbs. steel rails laid on 12 wooden sleepers per 30 feet rail with bearing plates and 6 spikes to each sleeper. The line is well ballasted with stone ballast. The gauge on the 660 feet radius curve was exact (3′ 3-3/8″) and the super-elevation was $1\frac{1}{2}$″.

6. The train consisted of 30 vehicles including four Ghat brakes, 24 goods wagons (bogie and four-wheelers) and two 18-ton weighted brake vans. There were two locomotives, *viz.*, the leading train engine and the Ghat engine in the rear. Of the 24 goods wagons 15 were empty and 9 loaded, marshalled in mixed order. The total gross load behind the leading engine, excluding the weight of the Ghat engine in the rear, was 305 tons. The first seven and the last six vehicles and both the engines kept the rail, the middle 16 vehicles having derailed. The leading vehicle of those derailed was a four-wheeled wagon No. 5112, with a wheel base of 8′ 9″.

7. *Evidences and conclusion.*—The point of first derailment is about 5 feet from the south end or exit of the tunnel No. 4, *i.e.*, about 70 feet past the tangent point of the right handed sharp curve of 660 feet radius. A broken axle box was found lying about 25 feet beyond the site of first derailment. This axle box was found afterwards to belong to the four-wheeled empty wagon No. 5112 (the leading derailed vehicle). There is therefore no doubt that the first vehicle to derail was wagon No. 5112, and that the axle box broke after it had derailed.

8. This vehicle derailed on the left of the track, *i.e.*, on the outside of the right handed curve, the left leading wheel mounting the outer rail; and owing

to the sharp curve the following vehicles were in turn derailed and dragged on till they capsized.

9. The Acting Train Examiner Mr. J. Loveday stated that on examination of the state of the wheels of the first four derailed vehicles he found that all of them were in good state except those of wagon 5112. The outer rail of the sharp curve shows signs of wear and the conditions on the whole would appear to be favourable for the leading left wheel of the empty 4-wheel wagon No. 5112, travelling at 12 miles per hour mounting the outer rail.

10. There was no slackness of gauge on this sharp curve, which renders it difficult for a 4-wheeler to negotiate it, and the super-elevation of $1\frac{1}{2}''$ is considered excessive for speed of 12 miles per hour which is the maximum speed allowed on this section. The train according to most of the witnesses was actually travelling at 12 miles per hour before the accident. It is therefore concluded that the empty four wheeled wagon No. 5112, with a wheel base of 9 feet, and worn profile of the wheels, while travelling slowly over the sharp curve with no slackness of gauge and excessive super-elevation had a very small proportion of its weight on the outer (or left) wheel to keep it on the rail.

11. *Recommendation.*—(1) The track on the 660 feet radius curve should have at least $\frac{1}{4}''$ of slackness in gauge (*vide* item 109 R. of Schedule of Dimensions).

(2) The super-elevation on the curve should not be more than $\frac{1}{2}''$, *i.e.*, for maximum speed of 12 miles per hour allowed on this section; other curves should be similarly checked.

(3) More attention should be given to the profile of the wheel flanges of wagons running on this section with sharp curves, especially when the 4-wheelers are running empty.

2. EAST INDIAN RAILWAY.

DERAILMENT OF 13 WAGONS ON A. N. 34 DOWN GOODS TRAIN AT RANIGANJ ON THE 31ST JANUARY 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1051/XIII/33, dated the 6th June 1933 (4484-T).

I forward herewith a copy of the proceedings of an enquiry held on the above accident.

2. *Details of Accident.*—On the morning of the 31st January 1933 the Permanent Way Inspector, Ondal, had arranged to renew the north and south stock rails (but not the switches) of the trailing points No. 25E of the crossover leading from the down slow to the down main line of Raniganj station. The stock rails and their switches were of 87 lb. section. In doing the renewals he used stock rails of 90 lb. E. I. R. pattern which are, when new, 5/32″ of an inch higher than 87 lb. rails, the stock rails were not new but from stock and were said to be in perfectly sound condition. He issued the following telegraphic message to Station Master, Raniganj, " Mile 120/9 to 120 down main line under repairs from 9/10 to 12 hours. Warn guards and drivers to look out for signals ".

The work commenced at 9·10 hours and the Permanent Way Inspector himself supervised the changing of the south stock rail and left by 22 Down (due departure 10·27 hours), handing over the work of supervising the changing of the north stock rail to a Head Mistry who says he completed the work by 12 hours. When leaving the work the Permanent Way Inspector left a written cancellation message for the Head Mistry to hand over to the Station Master when the work was completed. The Head Mistry handed the message over at 14/40 hours, *i.e.*, 2 hours and 40 minutes after he had (according to his statement) finished the work.

The Station Master, Raniganj, issued Caution Orders for all down trains, until receipt of the cancellation message ; 14 down express (which left Raniganj at 14/00 hours) was the last stopping train to receive the caution order. The next train to pass over the points was 8 Down express, this train did not stop at Raniganj but went through at normal speed. It left Asansol (the last stopping station) at 14/7 hours and passed through Raniganj at 14/22 hours. This train did not receive a caution order—a point which I shall deal with later.

The next train to pass was A. N. 34 Down Goods which met with the accident. In passing over the points a wagon derailed at trailing points 25 E, and was dragged some distance forward before its coupling broke and it became detached from the front portion of the train, the vehicles in rear ran into it, some telescoping while others were badly damaged. Altogether 13 vehicles (8th to 20th) were derailed. The train was a load of 59 vehicles all loaded and fully vacuumed. The derailment caused a complete dislocation of all traffic, as a diamond crossing over the two down lines and also the up line was damaged. The approximate cost of damage was :-

	Rs.
Permanent Way material	7,000
Rolling Stock	12,000
Rs. ..	19,000

None of the staff sustained any injuries.

3. *Points noticed after the Accident.*—(*i*) The Divisional Superintendent mentions that, after the accident, there were " grazing marks on and stripping of the stock rail " and that " the switch rail was absolutely undamaged ". He also states that it was " evident that some foreign object interfered between the rim of the left hand wheel on a wagon and the stock rail. Derailments at trailing points have occurred, which have been accepted as due to the axle guard bridle bar coming loose at one end and so hanging and jamming between the tongue and stock rail. The stripping of the rail and the marks of the derailment would point to this having occurred in the present case."

(*ii*) The Committee of Enquiry state that, after the accident, the following points were observed :—

(*a*) The North Stock Rail was tilted northwards.

(*b*) The toe of the North switch was gaping to about 1″.

(*c*) Both jaws of the Gauge Tie Plate were distorted outwards.

(*d*) The inner surface of the North Stock Rail had distinct shear marks running for several feet.

(*e*) The North Stock Rail was found to be higher than its adjoining switch Rail.

(*f*) There were no marks of any unusual kind on either of the switches.

(*g*) The outer face of one tyre of a pair of wheels bore distinct marks as if it had grazed past the side of a rail. Similar marks were found on the outer edge of one tyre of the other pair of wheels of the same wagon.

(*h*) They rule out the possibility of a bridle rod or brake beam hanger fouling the space between the stock rail and the switch rail, for, if this " had occurred there would undoubtedly have been some very distinct markings on the sides of the rails between the North stock rail and the switch. Close examination revealed no distortion of or marks on the switch ".

(*i*) An experiment was tried over trailing points of which the stock rail was 5/16″ higher than the switch, when it was seen that the wheels of the vehicles shunted took the stock rail without the slightest difficulty.

(*iii*) Mr. W. D. Thomson, Assistant Superintendent, Way and Works, arrived at the site about 1½ hours after the accident occurred. In his evidence he states that, after examining the points, he noticed the following :—

(*a*) a mark along the inside face of the north stock rail.

(N.B.—I questioned Mr. Thomson as to what he meant and he said that the corner of the rail had been sheared off.)

(*b*) the stock rails were 90 lb. E. I. R. and the tongue rail 87 lb. The difference in height of the stock rail and switch rail was 1/16″.

(N.B.—The Permanent Way Inspector mentions the difference as being 1/8″. For new rails the difference is 5·306 — 5·150=0·156″=5/32″).

4. *Cause of accident.*—The following points appear to be clear :—

(*i*) the top edge of the stock rail had been chamfered off ;

(*ii*) from enquiries which I made the only debris that was found near the railing points where the accident originated were strips of metal which appear to have come off the rail ;

(*iii*) absence of marks on the gauge face of the rail and the side of the switch rail, indicate that, if the derailment was due to some obstruction, the obstruction did not get jammed between the gauge face of the rail and the side of the rail ;

(*iv*) the north stock rail and its switch were both tilted outwards, *i.e.*, in the same direction. (This also discounts the idea of any obstruction getting in between the stock and switch rail).

(*v*) both jaws of the gauge tie plate were distorted outwards ;

(*vi*) if any of the fittings of the wagon had become detached it must have got jammed tight immediately in some way, for, it could not have sheared off the edge of the rail if it were hanging loose.

The only cause which I can think of other than those given in the proceedings, which can account for the above mentioned points and the information I obtained at the enquiry, is that the left hand wheels (facing Howrah) of one of the axles of a wagon, for some reason which I cannot assign, refused to mount the difference in height between the stock and the switch rail and, in rubbing against the rail, the outer edge of the tyre chamfered the rail.

If such an accident had been described to me, I would be more than surprised but the derailed wagons were fully loaded, which would help to keep the wagon from mounting. But then why finally did the right wheel and not the left wheel mount ? The reason was probably because the shape of the flange of the tyre of the right wheel made it easier for this wheel to mount. Any way, whether this was the actual cause or not, the fact remains that it cannot be considered good practice to put stock and switch rails in turn outs (even if they are for trailing points) of different heights in main lines.

3. NORTH WESTERN RAILWAY.

DERAILMENT OF NO. 85 UP PASSENGER TRAIN AT MILE 19/40 NEAR DHARAMPORE STATION (KALKA SIMLA RAILWAY) ON THE 17TH APRIL 1933.

From the Hon'ble H. T. deB. Bingham, Senior Government Inspector of Railways, Circle No. 4, Lahore, to the Secretary, Railway Board, letter No. 38/T., dated the 25th April 1933 (4539-T.).

In accordance with Rules 7 and 8 of Railway Board's Notification No. 1926-T., dated the 30th of July 1930, I beg to submit a report of the enquiry held by me into the circumstances attending the derailment of No. 85 Up Passenger train at Mile 19/40, near Dharampore station on the Kalka Simla Railway on the 17th April 1933.

2. The enquiry was held at Dharampore on the 22nd and 23rd of April 1933. The site of the accident was visited by me on the 22nd and 23rd April 1933.

3. The following officers attended the enquiry :—

Mr. L. E. Brock, Divisional Superintendent, Delhi.

Mr. A. C. Vining, D. T. O., Delhi.

Mr. A. Cornish, D. R. O., Delhi.

Major H. de. L. Panet, R.E., D. E. N. 1, Delhi.

Mr. B. C. Drummond, S. D. O., Dharampore.

Mr. A. Johnson, A. R. O. 1, Delhi.

Mr. S. S. Stubbs, A. O. O., Simla.

Mr. A. P. Low, Railway Magistrate, Simla.

Mr. P. C. D. Beaty, D. S. P.

4. *Description of accident.*—At about 6·55 hours on the 17th of April 1933. No. 85 Up Express train proceeding from Kalka to Simla and running 10 minutes late was derailed at Mile 19/40 between Sonwara and Dharampore.

5. The composition of the train was as follows :—

Engine Class K. No. 30.

Third class Bogie Coach No. 200.

Inter and Third class Bogie Coach No. 172.

First and second class Composite Bogie Coach No. 57.

First and second class Composite Bogie Coach No. 54.

Luggage Van Bogie No. 523.

Brake Van Bogie No. 445.

The train was vacuum-braked throughout except the engine which is fitted with steam brake and hand brake. The load behind the engine was 65½ tons. The engine was 2-6-2 type with maximum axle load of 9·44 tons.

6. The train derailed on a curve while passing through a cutting which had an overbridge in the centre of the curve. The engine apparently derailed in the latter half of the cutting and came to rest at the end of the cutting, turning over on its left side to approximately a position of 45° from the vertical. The exact point at which the engine derailed cannot be definitely ascertained but from marks on the outside rail it would appear that the point was mile 19/40. The final position of the engine was 30 feet in advance of this point. The first coach No. 200 was derailed and came to rest some 6 inches away from its normal position on the rail, and the leading end of it was telescoped approximately 3 feet due to its impact with the engine. The second coach No. 172 was derailed and came to a stand against the left side rock face of the cutting at an angle of 75°. Very little body damage occurred to this coach. The couplers, however, were torn off. The third coach No. 57 derailed approximately 4″ out of its normal position on the running rails and came to rest immediately underneath the overbridge in an upright position. Very little body damage occurred to this coach. The couplers here were also torn off. The fourth, fifth and sixth vehicles did not derail but the fourth vehicle received slight damage, the other two being undamaged.

7. *Casualties.*—The casualties resulting from the accident are as follows :—

1 male passenger seriously injured.

3 female passengers slightly injured.

3 male passengers slightly injured.

3 engine crew slightly injured.

The seriously injured person was travelling in the front compartment of the leading bogie. The rest of the injured persons, excepting the two firemen and the driver, were travelling in the three derailed bogies.

8. The Station Master, Dharampore, a European passenger and the Guard of the train rendered first aid immediately after the occurrence. The persons, who received minor injuries, were allowed to proceed to their destination by the special train run on this occasion. The person who was seriously injured was conveyed to Kalka in company with Dr. Inder Singh of the Hardinge Hospital, Dharampore to the Kalka Hospital.

9. The body work of the coaches on this train is made up of steel angle iron, aluminium alloy panel sheeting and subsidiary wooden pillars and interior panelling. This construction withstood the accident remarkably well, as it is felt that had it been of wood considerably more damages and casualties would have occurred.

10. The Accident and Relief Train was ordered from Kalka at once and left at 8-30 hrs. and arrived at the scene of the accident at 9-50. I am satisfied that all possible aid was rendered to the injured passengers and that the arrangements for the transhipping of passengers during the block were expeditiously carried out.

11. The estimate of the damage to the engine and rolling stock is as follows :—

		Rs.
Total cost of damage to engine (approximately)		440
Total cost of damages to rolling stock (approximately)		1,692
		2,132
Damage to permanent way		16
	Rs.	2,148

As regards the damage to the engine, I have to remark as follows :—

The cab was partially telescoped, the motion and tanks on the left side were damaged due to the engine falling on its left side against the rock face of the cutting and the front and back buffer beams were bent back, also the leading bissel was turned away from its pivot pin.

12. The weather at the time was fine and for some time previous to the accident, no rain had fallen, and in consequence, the track was perfectly dry.

13. *Description of the locality of the accident and other factors.*—The accident occurred on a level portion of the track. The radius of curvature, when actually measured on the ground, was 122·7 ft. The correct curvature, according to the Plan and Index section, is shown as 120 ft. The gauge round this curve, as checked immediately after the accident by Mr. B. C. Drummond, S.D.O., Dharampore, and Mr. Creighton, Duputy Director, Mechanical Engineering with the Railway Board, was found to be 2′-6$\frac{5}{8}$″, which is correct. The super-elevation was 2$\frac{1}{2}$″, which is correct. The check-rail clearance was found to be 2$\frac{7}{8}$″, which is correct.

14. With reference to the above observations, I would remark as follows :—

The site of the accident is at mile 19/40 chains. From Sonwara station at mile 16·26 chains to mile 19·17, the grade rises continuously at 1 in 33 with short distances of flatter grade. From mile 19·17 to mile 19·27, the line rises at a grade of approximately 1 in 100. From this point to the site of accident and for some distance beyond, the line is level. From the point where the grade changes from 1 in 33 to 1 in 100 and to the level portion as far as the site of the accident, the alignment of the track is comparatively free from curves, specially, the level portion immediately preceding the curve on which the accident took place.

15. The permanent way is of 60 lb. F. F. rails on wooden sleepers with bearing plates. The number of sleepers per rail length is n+3. The inside of the curve is check railed. Sufficient ballast is provided.

16. I made a careful study of the condition of the track on the morning of the 23rd and took certain measurements. I found that the gauge was as stated by Mr. Drummond and Mr. Creighton in their statements, *i.e.*, 2′-6$\frac{5}{8}$″ with a very slight tightening of this dimension at certain places but not sufficient to be taken into consideration. The super-elevation was also checked by me personally at various places on the curve and I found that this curve, although designated as a "Non-transition" curve had actually become a transition curve during years of adjustment by Permanent-way staff. The curve as it stands at present is definitely a Transition curve and the super-elevation at the beginning of this curve is 1″ and gradually increases until the circular curve with a radius of 122·7 ft. is reached. Along the circular curve, the super-elevation was found to be 2$\frac{1}{2}$″.

17. On examination, the check-rail was found to be functioning correctly and I observed that the inner side of the check rail was highly polished. The track did not appear to have shifted in any way immediately before or at the time of the accident. I made a special note of the wear on the outside rail of this curve and found that the wear is by no means excessive in comparison with many other curves on this section.

18. With regard to marks on the running rails, check-rail and sleepers, I would observe as follows:—

The most important point is that there were no signs of any marks whatsoever either on the inside running rail or the check-rail adjacent to it. This is a most important fact which has been observed by all the Divisional Officers who attended immediately after the accident and by myself on my personal inspection. This point will be discussed further on. With regard to marks on the outside running rail, it is difficult to determine which marks were caused by the engine and which were caused by the other derailed vehicles. There is also the possibility of subsequent marks having been caused during re-railing operations. There were four outstanding deep marks which must have been caused during the derailment either by the engine itself or by one of the following carriages being forced off the line. Whatever the cause of these marks on the outer rail, they do not help in any way to come to a conclusion as to why this train derailed. As regards the condition of the sleepers after the accident, there were three sleepers badly crushed on the outside of the outer rails which had obviously been caused by the derailment of the engine.

19. An examination of the engine cab gave the position of the control levers as follows:—

Steam regulator	Closed.
Vacuum brake	Driver's handle running position.
Steam brake	On.
Hand brake	Released, not on.
Reversing gear	In fore-gear, fourth notch.

This engine is not fitted with a speed indicator and recorder.

20. An examination of the engine showed that there was no apparent mechanical defect and that the flanges (left and right side) of all wheels, *i.e.*, front bissel, leading, driving and back bissel and brake gear were in good condition. This was to be expected as the engine was received from Moghalpura Shops after intermediate overhaul on 17th March 1933 and its mileage since that date was approximately 1,500 miles.

21. An examination of the coaching vehicles showed no apparent mechanical defect. Brake gear and wheels and axles including tyre flanges were in good condition. Prior to leaving Kalka, the brakes were tested and adjusted by the driver and the T. X. R. staff and the train left all correct. The electric communication between the driver, guard and passengers was tested prior to leaving Kalka and was certified as correct.

22. The sanctioned maximum speed for passenger trains by day on the Kalka Simla Railway is 15 miles per hour.

23. The engine driver had driven 24 trains since his transfer to this section prior to working 85 up on the date of the accident.

24. *Evidence.*—Seven statements were recorded at the enquiry.

25. *Conclusions.*—The possible causes for the derailment are enumerated below :—

(*i*) Condition of engine.

(*ii*) Condition of rolling stock.

(*iii*) Defective permanent way.

(*iv*) Obstruction on the track.

(*v*) Excessive speed.

With regard to Nos. (*i*) and (*ii*), from my perusal of reports submitted to me by the Divisional Officer concerned and from the observations made immediately after the accident, I am satisfied that the condition of engine and rolling stock was not in any way contributory to the cause of the accident.

As regards No. (*iii*), I am satisfied that the condition of the track at the time of the accident was in no way contributory to the derailment of this passenger train.

As regards No. (*iv*), there is no evidence whatever to show that there was any obstruction of any kind on the permanent way.

As regards No. (*v*), I am of the opinion that the derailment of the train was due to excessive speed, for which I am also of the opinion that the driver of the train must be held responsible.

26. The most important evidence recorded is undoubtedly that given by Mr. Creighton, who has very definitely stated that the accident, in his opinion, is entirely due to excess of speed. This Officer's observations as regards the speed of the train prior to the accident are specially valuable on account of the fact that he is a trained Locomotive Engineer and as such, undoubtedly possesses a deal of experience in the matter of speeds of engines while running on the track. In his evidence, he states that he estimates the speed of the train 5 seconds before the derailment as between 27 and 30 miles per hour and also adds that at the actual time of occurrence the speed probably exceeded 30 miles per hour. I am of the opinion that the speed as estimated by Mr. Creighton may be somewhat exaggerated, as it is questionable whether the train in question could have obtained a speed of 30 miles per hour or more in such a short distance after leaving the uphill grade. I am of the opinion also that any train travelling at the speed estimated by Mr. Creighton would have left the rails considerably earlier on the curve and that the damage sustained by the train would have been considerably more. Mr. Creighton's evidence, however, undoubtedly bears out the fact that the train was definitely travelling at a dangerous speed considerably in excess of the 15 miles an hour. The fact that the train was running ten minutes late must be taken into consideration when arriving at conclusions.

27. The significant fact that the check-rail bore no marks whatever proves conclusively that the inner wheels of the engine and derailed vehicles had, by centrifugal force, lifted from the inner rail before the train actually derailed. There is no other reason for accounting for the entire lack of any marks of any sort on the check-rail.

28. Considering the position taken up by the engine, the damages caused to the engine and the position taken up by the three derailed coaching vehicles, it is evident that such damages could only have been caused due to the train leaving the rails while travelling at an excessive speed.

29. In view of my opinions expressed above, I do not place any great reliance on the evidence given by the crew of the engine or the guard as regards the speed of the train. I feel that there has been collusion between them to evade any responsibility that might be attached to them.

30. I do not consider it necessary to call the evidence of any passenger travelling on this train as regards the speed. Such evidence given by passengers is most unreliable, more especially on a section such as the Kalka-Simla.

31. *Recommendations and observations.*—If reference is made to Mr. Scruby's report on a derailment of No. 83 Up passenger train near Barog on 7th July 1931, paragraph 34, it will be observed that he expresses the opinion that speed recorders should be fitted to all engines of passenger trains on this railway, as also on other hill railways where similar conditions obtain. I am informed that at present only one engine on this section is fitted with a speed indicator and recorder and I consider it very desirable that Mr. Scruby's recommendation of 1931 should be carried out.

32. It is observed that the driver to blame in this accident is comparatively new to this section and had only done 24 trips prior to the accident. I recommend, therefore, that in future drivers should have more experience of this very tricky section before they are put on to work passenger trains.

33. As regards the time allowed for the running of trains on this section, it is noticed that the average through timings of trains between Kalka and Simla work out at 12 miles per hour. On the other hand I note, for instance, that the timing of 85 Up from Sonwara to Dharampore works out at 13·3 miles per hour and 3 out of the 4 miles of this block section is a continuous ruling grade of 1 in 33. I think in preparing the time table more attention should be paid to the gradients of each block section.

34. As regards speed on curves, my attention is drawn to paragraph 241 of the Way and Works Manual. This paragraph forms a correction slip dated 14th January 1931 and the formula laid down for determining the maximum safe speed round curves is $V = 1\frac{1}{8}\sqrt{R.}$ If we apply this formula to the curve in question, we get the correct safe maximum speed to be 12·37 miles per hour. This figure does not correspond with the maximum speed allowed for this section, *i.e.*, 15 mile per hour.

4.—EAST INDIAN RAILWAY.

Derailment of No. 2 Down Punjab Mail between Dumra and Burhee stations on the 2nd May 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1068/XIII/33, dated the 8th June 1933 (4566-T.).

I beg to submit a report of the enquiry into the circumstances attending the derailment of No. 2 Down Panjab Mail at 23-23 hours on the 2nd May 1933 between Dumra and Burhee Stations.

2. *General Description of the Locality.*—The accident took place on the Down Line near the Howrah abutment of a long masonry Viaduct (Bridge No. 163), which consists of 100 spans of 15 feet masonry arches at mile 273 T. P.-19-20 from Howrah. The spill channel under the viaduct has a dry bed at this season and the country on the right is dry low land without any trees or habitation for miles round. On the left side, there are certain number of trees as one approaches the bank of the Ganges River. The night was dark and cloudy after early setting of a young moon. The railway bank at this spot is 15 feet high. Being the main line between Howrah and Moghalserai, the railway tracks consist of Double Line—the Up Line is laid with 90 lbs. F. F. rail on E. I. Railway type of cast iron sleepers and the Down Line with 85 lbs. B. H. rails on D. O. plates. The number of D. O. sleepers in the Down Line is 15 in a rail length of 36 feet (n + 3). The line is level and dead straight with no curves and the view is very clear.

3. *Description of the Accident.*—On 2nd May 1933, the train which passes on the Down track ahead of the Mail, was 16 Down Passenger, and this passed the site of accident about 22-20 hours. 2 Down Punjab Mail consisting of APC class engine No. 156 and ten bogies left Mokameh Junction at 23-8 hours. At 23-23 hours the Mail, with Engine Head Light burning, was crossing the viaduct at Mile 273/19-20 at a speed of 45 miles per hour. When the engine had nearly crossed this viaduct and was still 138 feet away from the abutment, the engine suddenly jumped off the rails. The train remained on the formation up to end of the bridge and then plunged diagonally down the bank which is about 15 ft. high. The Engine did not topple over but kept to her wheels and after ploughing through the track and the slope of the bank came to rest a little beyond the toe of the slope. The engine crew, although badly shaken, did not receive any serious injuries.

The first bogie consisted of inter class compartments and two compartments of front brake van. This was badly smashed. The 2nd bogie (a 1st and 2nd class composite Delhi through carriage) left its underframe and rode over the floor of the first bogie completely demolishing the inter class portion and the 1st compartment of the brake portion. All the dead bodies and most of the injured were found in these 2 bogies. The 3rd bogie (a First and Second Class composite Kalka through carriage) was half way down the bank. The 4th bogie (also a 1st and 2nd class composite—Kalka through carriage) had its leading wheels on the slope and rear wheels on top of the bank. The 5th (an inter class bogie) and 6th (a 1st and 2nd class composite—Lahore through carriage) got derailed but remained on the bridge in an upright position. The last 4 bogies, *viz.*, the 7th (Mail Van), 8th (Inter and rear brake van), 9th (1st and 2nd class composite—Dehra Dun through carriage) and 10th (1st and 2nd class—Patna through carriage) remained on the track and were drawn off and sent to Howrah as the duplicate Mail after suitable examination.

4. As soon as the train came to a standstill, the train staff and the unhurt passengers from the rest of the train came out. They with the help of Electric hand torches helped the passengers from the tilted and smashed coaches. They state that there was lot of dust and smoke in the beginning but luckily the electric lights and fans in the compartments still kept on burning and this greatly helped the rescue work. The Engine on its downward career smashed up a telegraph post and all Railway and Control wires that were running along this side, thus cutting off all communications between Burhee and Dumra Stations. The Government and Postal Telegraph wires, being on the other side of the railway lines, remained intact. After satisfying himself that the up line was quite clear and after protecting his train in the rear, the Guard of the train (Collins) sent his Conductor

Guard (Forster) and a Relieving Guard (Marshall), who was also travelling by the Mail to Jhajha, to give the information to nearest station and asked for assistance and medical help. They walked a distance of 2 miles on foot and gave the first information of the accident to Station Master at Burhee station at 0-12 hours. Not knowing that the information has been sent already, they were followed to Burhee station by another Railway Official (Halden, Senior Fuel Inspector, Allahabad, who was travelling with his wife to Calcutta as a 2nd class passenger in the Mail) who offered to walk up to Burhee and he was accompanied by an Indian passenger (whose name we have not been able to ascertain).

5. The Relieving Guard Marshall showed great presence of mind by getting in touch with Jhajha station on the Control Phone when the latter station was talking to Jamooee station. Later on, news of the accident was also given to Kiul who communicated it at once with the Deputy Controller at Dinapore *via* Gaya over the Grand Chord line. The news reached Dinapore at 0-30. The Mokameh Relief train was ordered out at 0-45 hours and left Mokameh station with Station Master, Loco. Foreman and Sub-Assistant Surgeon, Mokameh, at 1/55 hours and was first to arrive at the site of accident at 2-25 hours.

The news got to Jhajha station at 0-25 hours and relief train with Military Assistant Surgeon, Ailing and his staff, left at 1-42 hours reaching the site of accident at 3-05 hours. The Station Master, Jhajha, also asked for 30-ton crane from Jamalpore and this with Relief Train and Railway District Medical Officer, Jamalpore, also reached at 4-32 hours. On getting a message from Station Master, Burhee, the Deputy Superintendent of Police with a posse of Punitive Police, stationed at Burhee, also arrived at the scene of accident on foot at 1-00 hours.

6. Mr. Marriott, Divisional Superintendent, Dinapore, who was on his way by 16 Down to Calcutta was communicated with at Jasidih Junction Station. He caught 1 Up Mail and was the first Railway Officer to arrive at the scene at 3-30 hours and took charge of the operations.

The Senior Superintendent, Way and Works, Mr. K. B. Lal, the Assistant Commercial Officer, and the Superintendent of Power and District Medical Officer all left Dinapore by 72 Down. They were joined on the way by the Railway Sub-Divisional Officer, Patna and Superintendent of Railway Police. They all reached the site at 6-20 hours.

7. *The rescue work and Medical Aid.*—The First Aid Box from the Guard's Brake Van was taken out by Travelling Ticket Examiner (Mr. Jog) and Dr. Aich of Calcutta who was a passenger in the train with the help of some European and Indian passengers and train staff gave " First Aid " to the wounded. As two or three persons were badly trapped in the wreckage of the 2nd bogie, the emergency tool box was also used with some effect by some of the passengers. The rescue work quickened up when the help arrived with better tools from the Relief Vans. The last of the wounded men was finally released from the wreckage at 7-30 hours. 31 Up Goods was the first train to run on the up line after the accident. She was stopped and some of the serious cases were sent up to Mokameh Hospital for treatment. Later on some of the injured were removed by 1 Up Mail to the Railway Hospital at Dinapore and were properly treated there.

8. *Casualties and General Treatment.*—The total number of dead was 5 and injured 13. The damage to rolling stock and permanent way was approximately Rs. 48,000. Great difficulty was experienced in getting the dead bodies identified but this was eventually done. Every facility was given by the Railway and Civil Officials to the relatives of the deceased in removing and disposing off the dead bodies.

9. *Restoration of Traffic.*—The last 4 bogies of the Punjab Mail were brought back into Mokameh and were again started as " duplicate Punjab Mail " at 6-07 hours reaching Howrah at 15-45 hours. Coaches Nos. 5th and 6th were re-railed and the Double Line working was resumed at 17-30 hours on 3rd May 1933 after slewing both Up and Down tracks with a speed restriction of stop dead and 5 miles speed on both the tracks.

10. *Evidence.*—The first detailed investigation to ascertain the cause of the accident was made by a 1st class European passenger Mr. Dearden (of the Associated British Machine Tool Company, No. 6, Old Post Office Street, Calcutta) about

15 or 20 minutes after the occurrence. He was accompanied by Guard Collins, Driver Carr and Ochme, a Railway Staff Inspector, Allahabad, who was also a 2nd class passenger and a few other passengers. They inspected the site in the dark with the help of Electric torches and took the precaution of posting a Police constable Gaya Singh (who with 2 other policemen were travelling on the Mail train in charge of some treasure in railway transit) at the site to guard against any one disturbing the track or the evidence till some senior Police Officer arrived on the scene. The site was again carefully inspected by Mr. Marriott, the Divisional Superintendent, Dinapore, between 3-30 and 4 hours. It was also inspected by Mr. K. B. Lal, Senior Superintendent, Way and Works, Mr. Baker, Superintendent, Power, Mr. Goswami, the Railway Sub-Divisional Officer and Permanent Way Inspector Gear at 6-20 hours on arrival of the party from Dinapore by 72 Down.

11. All the witnesses agree on the main points which can be summarised as follows :—

One Bull Headed rail on the left side of the track was lying flat on its side but still in alignment. The Delhi joint had been unfished and the 2 fish-plates were lying one close to the other, on top of the ballast outside the track, with the 4 bolts with their nuts again screwed on a few threads 2 on each side of the joint. The threads of these fish-bolts looked " freshly oiled ". The rail was lying flat with its running table facing towards the left parapet wall of the bridge. There is a clear wheel flange mark on the web of the rail from one end to the other. At the Howrah joint of the rail, the fish-plates were also removed and one fish-plate and one fish-bolt without nut were found lying nearby along the ballast. No one appeared to have noticed the inner jaws of the D. O. plates which were mixed up with ballast but 8 steel cotters were found lying scattered about alongside on the outside of the track. Most of the Tie rods in this rail length were found badly broken. The Delhi end of 2nd rail had deep flange cuts on the head of the rail showing that it was standing in the vertical position and was badly battered by the carriage wheels. This rail was bent inwards and was lying within a foot of the right hand rail. The right hand rails were intact throughout up to a point opposite the 3rd vehicle where the plates had broken. Mr. Marriott's report shows that there is a distinct burr mark on the last fish bolt-hole on the Howrah joint which indicates that a fairly long bar with considerable leverage was used for levering the rail out of position from the D. O. plate.

At the Delhi joint, the 2nd hole in the rail end shows a small burr mark on the bottom of the hole inside, which goes to show that a bar of shorter length and of rather small diameter was also used. This coupled with the fact that the running head of the rail was facing the left parapet wall of the bridge clearly shows that after removing the inner jaws and cotters the rail was levered out of its position by lifting the bottom portion of the rail towards the centre of the track. This appears to have been done by one long bar and one bar of shorter and thinner diameter. The first joint appears to have been unfished at leisure.

Mr. Marriott's report also shows that " at the Delhi end " of the displaced rail the " flange mark in web has indented slightly probably indicating wheels dropping on it." This also shows that before the engine of 2 Down Mail passed, the displaced rail was lying on its side which caused the wheels of the engine to drop vertically over the web while passing over this joint.

On enquiry I gathered that the fish-bolts in this section were oiled last in February 1933. I also carefully examined the fish-bolts and fish-plates on the morning of the 4th May in the presence of the Superintendent, Railway Police and Deputy Inspector General of Police, Bihar Province. The light shining marks along the different surfaces of the nuts and the absence of a burr on the edges, show that a closely fitting spanner has been used to unfasten the nuts from the bolts. No Clyburn or badly fitting spanner appears to have been used. A very peculiar feature is that the 4 bolts after being unscrewed had their nuts screwed back on the bolts.

12. Mr. Goswami, the Railway S. D. O. and P. W. I. Murray in charge of the section deposed as follows :—

(*a*) There was neither any friction between the gangmen and their respective mates or between railway men and villagers of this locality.

(*b*) The gang beats are of 3 miles section on this part of the main line including both the up and the down tracks, with 2 keymen, each with a jurisdiction of $1\frac{1}{2}$ mile each.

(*c*) The border line between Permanent Way gangs Nos. 4 and 5 is at mile post 274 which is situated somewhere half way on this long bridge.

(*d*) There are no gang huts for housing the gangmen between stations except at large stations like Mokameh, Jhajha, etc. The gang tools are locked up every evening in fairly well-built corrugated iron sheet tool boxes, kept in Burhee and Dumra station yards. The majority of the gangmen are local men and all go to their villages for the night.

(*e*) A few tools have been lost now and then in the Mokameh P. W. I's. section and the cost recovered through muster sheets but no spanners have been found missing.

(*f*) A few men have been retrenched owing to the extension of gang beats from 2 miles to 3 miles some time back, but most of the retrenched staff have been provided for in some capacity or other when vacancies cropped up.

13. *Conclusion.*—After carefully considering the evidence and inspecting the site of accident, I consider that the track on the down line at mile 273/19-20 was tampered with between 22-20 and 23-23 hours on the night of 2nd May with the criminal intention of wrecking 2 Down Punjab Mail. It is very fortunate that the site of derailment was only 138 feet from the Howrah abutment of the viaduct, otherwise the casualties and damage would have been much heavier. It appears that at least 2 men, or more, were involved and a proper spanner and a Crow bar were used. The operation must have taken 15 or 20 minutes. It is quite possible that the track was partly tampered with before 22-20 hours when 16 Down Passenger passed over it.

The Railway and Civil Police are investigating the case.

The Railway Officials and staff did what was humanly possible to send out the news and ask for assistance promptly. Inspite of the fact, that all Railway communications between Burhee and Dumra Stations were cut off entirely owing to the engine striking the Railway Telegraph Post, the Railway staff at Jhajha and Kiul Stations had the presence of mind to get in touch with the Control at Dinapore, and in addition ordered out the Relief Train and medical aid from Jamalpore.

The Relief Trains rushed out to the site of accident without the least delay.

Medical aid was prompt and adequate and injured men were well looked after. The passengers and relatives of the injured and dead were treated with all sympathy and given all help possible by the Railway staff after the accident.

14. *Recommendations.*—I would recommend :—

(*i*) The steel keys in the C. I. and D. O. plate road should be turned upwards at least through 60 degrees, as is done on the North Western Railway, so that the keys cannot come out so easily.

(*ii*) Arrangements should be made by which the sealed Emergency Tool Boxes can be inspected by the Carriage Department at regular intervals and oiled and cleaned.

5.—EAST INDIAN RAILWAY.

No. 1 Up G. S. running into a trolley at Rajhara on the 20th May 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1324/XIII/33, dated the 25th July 1933. (*4667-T.*)

I enclose herewith the Proceedings of the enquiry held on 26th May 1933 to investigate the circumstances leading to the above accident.

I agree with the finding of the Committee of enquiry.

Proceedings of an Official Committee held at Daltonganj, on the 26th May 1933 to enquire into the particulars of an accident which occurred at Mile 410/5 on the 20th May 1933.

Précis.—At about 18/40 hours, on 20th May 1933 a private trolley belonging to the Bengal Coal Company's Rajhara Colliery carrying the wife and children of the Colliery Manager to Rajhara Station was run into from the rear by 1 Up G. S. which had emerged from a cutting, at a point about 200 ft. short of bridge No. 248 over the Sadabah Nullah, in the vicinity of telegraph post 410/5 (*via* Sone-East-Bank), before the trolley could be completely removed from the track, and a 3-year old daughter of the Manager was killed.

Finding.—We, the undersigned having carefully considered all the evidence, do find, that Mr. Satyendra Nath Banerjee, Manager of the Bengal Coal Company's Rajhara Colliery is solely resposible for trolley No. 86 belonging to this Colliery having been run into by 1 Up G. S. near telegraph post 410/5 (*via* Sone-East-Bank) and about midway between the junction of the Colliery Siding with the Main Line and Bridge No. 248 over Sadabah Nullah, whilst, proceeding to Rajhara station, for the reason that the trolley rules and regulations were flagrantly disregarded as follows :—

(*a*) the availability of the last Trolley Pass No. 576 of 15th August 1930 issued *vide* Agent's Minute Sheet No. A. G.-200 of 16th August 1930 to Chief Operating Superintendent, having expired on 31st March 1931, the trolley was placed on the line without the Colliery Manager being in possession of a current pass or license to run a trolley on the Railway,

(*b*) a properly qualified person did not accompany the trolley,

(*c*) the trolley was being run after sunset and when visibility was only a matter of about 100 yards.

(*d*) the trolley was not equipped with either a red flag or a red light, and

(*e*) the trolley was manned by less than the prescribed minimum of four men laid down, and the physique of those two or three men who manned the trolley was such as to indicate that it would have been a physical impossibility for them to have lifted the trolley off the lines with reasonable expedition.

We find that two Trolley Signals have been provided on the banks of the nearby cutting to warn trolleys of approaching trains in either direction, but as the hours of duty of the men appointed to man these two Trolley Signals are from 6 to 18 hours, *i.e.*, average sunset time, the Trolley Signals in question were not manned at the time the accident occurred, which was about 18/40 hours, and the discs had been left in the turned off position showing no indication. We, therefore, exonerate the Driver of 1 Up G. S. from all blame for the accident and are satisfied from the distance in which he was able to bring his train to a stand after the accident that he had his train well under control and was not exceeding 25 miles an hour.

(Sd.) A. J. DORAN,
President,
Superintendent 'Staff',
Dinapore.

(Sd.) P. N. H. BAKER,
Superintendent (Power),
Dinapore.

6.—EAST INDIAN RAILWAY.

ACCIDENT TO No. 8 DOWN EXPRESS AT GOMOH ON THE 3RD JUNE 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1205-XIII/33, dated the 30th June 1933. (*4609-T.*)

I enclose the proceedings of the Officers' Joint Enquiry received from the Agent, East Indian Railway, with the finding of which I agree.

Proceedings of an Official Committee held at Gomoh on the 10th June 1933 to enquire into the particulars of an accident which occurred at Gomoh on the 3rd June 1933.,

Précis.—The Outgoing Engine of 8 Down Express No. 1903 when attaching on to its train on the 3rd June 1933, bumped severely on to the load causing slight injuries to eighteen passengers.

Driver Reynolds who was to have worked 8 Down Express reported sick on the Engine and 8 Down suffered a detention of 56 minutes waiting for another Driver to be called.

Finding.—We, the undersigned, having carefully considered all the evidence, do find, that the collision between the Outgoing Engine and the rake of 8 Down was due to a sudden attack of fainting on the part of Driver Reynolds at the moment he was nearing the rake.

We have examined the possibility of the collision being due to any one of the following causes also :—

(1) Drunkenness,

(2) Carelessness,

(3) Defective Brake.

The evidence of the Sub-Assistant Surgeon who examined Driver Reynolds immediately after the accident definitely rules out (1).

There is no evidence forthcoming that there was any carelessness on the part of either Driver Reynolds or any of the Engine Crew. It is clear that Driver Reynolds was at his post and on the look-out, and the evidence of the Assistant Running Shed Foreman indicates clearly that Reynolds is a careful worker and a man of sober habits.

With regard to the possibility of the accident arising through defective brakes, the testimony of the Outgoing Driver amply proves that the brakes of Engine 1903 were in good order and gave no trouble throughout the journey to Howrah.

We are therefore left with the only other possibility, *viz.*, Driver Reynolds having suddenly fainted. The evidence of the Engine Crew corroborates this conclusion.

(Sd.) A. E. HUBBARD,	(Sd.) O. R. TUCKER,	(Sd.) E. H. N. LOWTHER,
Superintendent, Way and Works (Grand Chord), Asansol.	*Superintendent (Power), Asansol.*	*Sub-Divl. Superintendent, Dhanbad.*
The 10th June 1933.	*The 10th June 1933.*	*The 10th June 1933.*

7.—EAST INDIAN RAILWAY.

No. 5 Up Lahore Mail running into a motor bus near Bhadohi station on the 6th June 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1231/XIII/33, dated the 7th July 1933. (4611-T.).

I forward herewith the proceedings of the enquiry held by a committee of Deputy Heads of Departments of the East Indian Railway at Bhadohi on 12th June 1933.

2. *Particulars of accident.*—At about 10·24 hours on 6th June 1933 when 5 Up Mail was approaching level crossing No. 31, situated about 400 feet outside the up outer signal of Bhadohi station, it collided with a motor bus. The motor bus was completely smashed up and came to a stand with the front end pointing in the direction from which the train had come, the rear end of the bus was across the wire fencing.

Fifteen of the passengers were killed on the spot, and sixteen (all but two with minor injuries) were treated in the hospital at Bhadohi where two of them subsequently died. So far as the committee of enquiry was able to find out there were another four passengers who were not hurt. The total number of passengers travelling on the bus was therefore not less than 36 ; the seating capacity of the vehicle was 20.

The level crossing is a B class level crossing with two gate-keepers. At the time of the accident, the gates were undoubtedly open to road traffic, and, apparently, the gateman was at the level crossing, or then close by, as Mr. G. D. Parkin, Superintendent of Police, Benares State (a passenger on 5 Up Mail) saw the gateman after the accident at the level crossing and questioned him as to how the accident had happened.

3. *Census of road traffic.*—The following is an abstract of the details :—

Period.	Motor Bus or Cars.	Ekkas.	Carts.	Cattle.	Bicycles.
6 A. M. on 9th June to 6 A. M. on 10th June ..	17	176	108	358	113
6 A. M. on 10th June to 6 A. M. on 11th June ..	22	178	86	250	130
6 A. M. on 11th June to 6 A. M. on 12th June ..	19	145	96	246	124
Total Vehicles ..	58	499	290	..	..
Average number of vehicles per diem	19	166	97		
Average number of *all* vehicles per diem ..	282				

The average spread over the 24 hours is not great, but there is an appreciable stream of road traffic about the time that 5 Up Mail passes (*i.e.*, between 9 and 11 hours) and in the late afternoon—the average number of vehicles per hour for these periods being 31·7 in the morning and 29·2 in the afternoon as against 11·6 per hour for the whole 24 hours.

4. *Cause of accident.*—The concentration of traffic in the morning and evening necessitates the gates being kept open for road traffic for an appreciable time, and the gateman is apparently guided by the lowering of Bhadohi station signals as to when he should close the gates to road traffic. The question arises as to whether he had timely indication on the day of the accident.

The committee of enquiry in their finding came to the conclusion that the outer signal was lowered about three or four minutes before the arrival of the train at the level crossing. Assuming that the train driver's statement to Mr. Parkin

that he was travelling at 58 miles an hour to be correct (which appears to be corroborated by the fact that the engine was 1,720 ft. from the level crossing when the train pulled up and according to Mr. Parkin the train was stopped quickly and smoothly) then the train was out of sight when the outer signal was lowered. As to where the motor bus was when the outer signal was lowered is not clear from the evidence. I come to the conclusion, as the committee have done, that the motor bus was coming along the road and was probably out of sight when the outer signal was pulled off.

Taking the speed of the train at 58 miles an hour (as stated by the driver to Mr. Parkin), and the speed of the motor bus at 30 miles an hour (as I shall deduce in the next few lines), then the train would be about 350 ft. from the level crossing when the bus was 173 ft. from it. Even if we believe the motor bus driver's statement that he did not see the train coming, I cannot believe that his attention was not drawn to the approaching train by one of the occupants of the motor bus in time for the driver to pull up the motor bus. From the experience I have had of other accidents between motor vehicles and trains, I am convinced that the motor bus driver, having noticed that the gates were opened, decided to make a dash across the level crossing ahead of the train. This is practically corroborated by Syed Hussain's evidence. The motor bus driver's evidence tends to support this theory for, when asked if he knew the gatekeeper Suchit, his reply was " Yes, he is the man who frequently closes the gate half an hour before the train is due to pass".

5. *Finding.*—The committee are inclined in their finding to lessen the responsibility of the gate-keeper for the accident on account of the difficulties under which he has to work. But no mention is made in any of the evidence that there was stream of traffic or even that a few other vehicles were passing over the level crossing about the time that the outer signal was lowered. I therefore come to the conclusion from the evidence that there was no real justification for the gates not being in their normal position, *i.e.*, closed to road traffic immediately after the outer signal was lowered. The gate-keeper is therefore primarily responsible for the accident and is being prosecuted. The accident however would never have occurred if the motor bus driver had exercised reasonable caution. I believe that the motor bus driver is also being prosecuted.

6. *Recommendations.*—If we take the number of casualties as the criterion, then this unfortunate accident will rank as one of the most serious accidents which has occurred on Indian Railways for the past few years and one is faced with the problem how to make it impossible or even difficult for the recurrence of a similar or worse accident. The Railway relies on a gate-keeper to carry out certain instructions. But the gate-keeper's position is a difficult and unenviable one. If he holds up road traffic for even a reasonable time, he is abused and threatened with a beating. If he is over zealous in passing road traffic he runs the risk of misjudging the time when to close his gates.

(*a*) *Semaphore stop signals.*—To ensure safety by the provision of mechanical appliances (*e.g.*, semaphore stop signals interlocked with the gates and placed at an adequate distance from the gates) will not only be costly but will actually cause still further hindrance to road traffic as it will take longer for the gates to be opened and, incidentally, in order to make sure that he does not detain trains the gate-keeper will close the gates earlier than he would if no signals were provided. However the fact remains that where before it was unnecessary to provide semaphore stop signals to assist the gateman in controlling traffic, with the advent of motor vehicles (generally overcrowded and in charge of men with little sense of reponsibility) conditions have changed and such provision is now essential in cases where vehicular traffic is frequent. As to the cost of erecting and working these signals (including oil and lamps, etc.), it is only logical that, in conformity with Section 11 (3) (*b*) of the Indian Railways Act IX of 1890, the cost should be borne by the Road Fund.

(*b*) *Responsibility of vehicle drivers.*—The primary cause of these accidents is the result of the level crossing gates being left open to road traffic when trains are approaching the level crossings, but I am confident, as in this case and other accidents, that these accidents would be less frequent if definite steps were taken towards insisting on motor drivers driving with great caution across level crossings.

As a preliminary step I would suggest increasing the penalty under Section 124 of the Railways Act IX of 1890 and making this section a cognisable offence.

(*c*) *Provision and standardisation of road signs.*—The driver of the motor bus stated that he had noticed boards some distance from the level crossing but he did not know what they were intended for. This was of course an absolute lie. The East Indian Railway have taken special measures to provide caution boards, other railways have also taken measures to provide caution boards or signs but of a different type. I do not think it is the duty of railways to provide these boards. I therefore suggest that :—

(*i*) Caution boards at level crossings should be standardised for all India ;

(*ii*) the cost of providing and maintaining these caution boards should be met by the Road Fund ;

(*iii*) drivers when examined for their driving licence should be examined as to the meaning of these caution boards and incidentally of other road signs also.

(*d*) *Red light and discs on level crossing gates.*—The Agent has, in his forwarding letter, drawn attention to the fact that the Magistrate, who attended the enquiry, made investigations as to whether the driver of the train should have pulled his train up in order to prevent the accident from happening. Actually in this case I understand that the Magistrate did not consider that the driver of the train was to blame. If however the accident had been at night and the Superintendent of Police, Benares State, who was on the train and immediately made enquiries, had found that the lamps were showing red to the track, then it is more than probable that the Magistrate would have held different views.

8.—EAST INDIAN RAILWAY.

No. 4 Down Mail running into a trolley near Mirzapur Station on the 20th June 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1358/XIII/33, dated the 29th July 1933. (*4627-1*).

I enclose the proceedings of the Joint Enquiry held in connection with the above accident which caused fatal injuries to the trolley holder (Head Mistry Kabir) and a trolleyman.

2. Apparently the men travelling on the trolley decided to be guided by the head light on the mail to warn them of the approach of the train. On this occasion the head light failed, so the warning was not such as would enable them to cut the trolley off in time. The failure of the head light was an unfortunate occurrence, but it does not absolve the trolley holder (one of the deceased) from his responsibility under East Indian Railway Subsidiary Rule 221(*b*) read in conjunction with paragraph 336 of the East Indian Railway Engineering Manual (Provisional issue 1932).

I agree with the finding.

Proceedings of an Official Committee held at Mirzapur on the 23rd June 1933 and on 30th June 1933 and 1st July 1933, at Allahabad to enquire into the particulars of an accident which occurred near Mirzapur on the 20th June 1933.

Précis.—At about 22-25 hrs. on 20th June 1933, the trolley of Head Mistri Kabir was run over by the 4 Down Mail.

Head mistri Kabir and Trolleyman Sukhdeo were killed.

Finding.—We, the undersigned, having carefully considered all the evidence do find, that the accident was caused by Mistry Kabir Hussain who relied entirely on the headlight of 4 Down Mail being visible from a distance and who took unjustifiable risk.

We are of the opinion that Kabir Hussain and Sukhdeo met their death in attempting to remove the trolley from the track after the other occupants had jumped off.

It is probable that, under the climatic conditions obtaining on that night, the trolley lights would not be visible for more than quarter of a mile and that, during the few seconds it would take the train to cover this distance, the attention of the driver, after he had satisfied himself that the signals at Mirzapur were lowered, was attracted to something else on the engine. We are satisfied that the train crew were on the alert.

(Sd.) A. GORDON, *Superintendent Power, Allahabad.*

(Sd.) F. N. BOSE, *Superintendent Way and Works, Allahabad.*

(Sd.) D. M. F. CHISHOLM, *Superintendent Transportation, Allahabad.*

9.—BARSI LIGHT RAILWAY.

No. 96 Down Special running into the breach in the line at mile 21 on the 1st July 1933.

From Mr. R. H. Irani, Senior Government Inspector of Railways, Circle No. 5, Bombay, to the Secretary, Railway Board, letter No. 1099, dated the 23rd August 1933. (4637-T).

I beg to submit the following report of an enquiry held into the above accident.

2. *Description of Accident.*—On the night of 1st July 1933, No. 96 Down Special was booked from Sangola to Wasud on the Kurduwadi-Miraj Section of the Barsi Light Railway at 20-33. At 22-45 she ran into a breach in the embankment at mile 21, about 150 yards in length, which had been caused by a flood. The engine capsized and eleven of the following vehicles were derailed. The Driver and Fireman sustained minor injuries, but the second Fireman was so seriously injured that he subsequently succumbed. None of the passengers or other train staff was injured. The injured engine crew were placed in one of the 3rd class cnaches for about 1½ hours and then taken on trolley to the Hospital at Sangola for treatment.

The transhipment of passengers took place from next morning and a large number of pilgrims was dealt with on account of the Ashadi Fair. Through communication was restored by means of a diversion until the restoration of the original alignment which took some time owing to the engine and derailed vehicles having to be removed. The total cost of the damage to property is estimated to amount to Rs. 22,000.

3. *Description of the train and the Locality.*—The train composed of an F class 2-8-2 engine No. 38, and 19 vehicles marshalled in the following order :—

Engine F No. 38—6 goods vans, 2 pilgrim thirds, 2 goods vans, 1 pilgrim third, 2 passenger third class, 3 goods vans, 1 parcel van, one goods van and one brake van.

Only the two third class coaches were occupied by about 15 passengers and all the other vehicles were empty. The train was equipped with full automatic vacuum.

The line is straight at the site of the breach there being a 1 degree curve commencing at about 700 ft. from the breach. There are two culverts No. 107—1 × 8′ girder and No. 109—1 × 3′ opening on either side of the breach which were too small to carry the large volume of the flood water that came down on this occasion.

The weather was rainy and cloudy but it had not rained nearly so heavily at either Sangola or Wasud as to cause apprehension regarding the safety of the line and the line patrols were consequently not sent out as is usually done at times of heavy rainfall.

4. *Evidence and Conclusion.*—From the evidence it appears that the abnormal flood was the result of the large bund about 3/4 mile away having burst discharging its contents into a lower area in which water was impounded by another bund. This bund in turn also burst and the whole of the contents of the two reservoirs was discharged into the nullah leading to culverts Nos. 107 and 109 which are not designed to carry such a large volume of water. The line was consequently overtopped by the flood and 150 yards of the bank were breached.

As the approach to the breach from the direction of Sangola is on a 1° curve up to about 200 yards from the breach, the driver could not see it in time during the night.

As regards the absence of patrols, there are standing orders for patrolmen being sent out should the rain be so heavy as to cause apprehension of danger to the line. There is ample evidence that the rainfall in the vicinity of the stations on either side of the breach was little and therefore it was not considered necessary to send out

patrolmen. There seems, however, no doubt that a sudden rain storm developed in the catchment area of the two reservoirs $\frac{3}{4}$ mile south of the line which caused the bursting of the bunds.

5. It is considered necessary for the safety of the travelling public that the bunds be provided with properly designed pucca escapes to carry away surplus storm water as these bunds are a distinct menace to the safety of the line. As an alternative the openings in the Railway line would have to be increased adequately to carry the large volume of water should these bunds breach, provided the bunds existed before the line was constructed. This is a subject of correspondence between the Agent, Barsi Light Railway and the Collector of Sholapur.

10.—EAST INDIAN RAILWAY.

SIDE COLLISION BETWEEN A PORTION OF DOWN ASANSOL PILOT AND NO. 12 DOWN EXPRESS NEAR RANIGANJ ON THE 4TH JULY 1933.

From Mr. A. I. Sleigh, Senior Government Inspector of Railways, Circle No. 1, Calcutta, to the Secretary, Railway Board, letter No. 1310/XIII/33, dated the 24th July 1933. (*4638-T*).

I submit herewith the report on the enquiry which I held at Raniganj on 7th July 1933 on the above accident.

2. The accident occurred at about 2-18 hours on the morning of 4th July 1933 resulting in the injury of 10 passengers who were travelling on 12 Down Express. All the injured were first taken by train to the hospital at Ondal (6 miles from the scene of the accident) for medical treatment. One was detained at Ondal, one subsequently sent to the Fraser Hospital, Burdwan, seven sent on to the Howrah General Hospital and one proceeded alone to Calcutta after the treatment he had received at Ondal.

The shunter and second fireman of one of the engines of the down Asansol Pilot reported sick after the accident but their injuries were very slight.

The estimated damage to the permanent way is Rs. 1,800 and to rolling stock about Rs. 40,000.

3. *Description of the locality.*—The accident took place close by the entrance to Searsole Colliery Siding No. 2 situated about $1\frac{1}{4}$ mile west of Raniganj station. This siding, like many other colliery sidings, takes off from a line used by passenger and goods trains, the points being trailing for such traffic. In this actual case the line in question was the down slow line. The site of the accident was on a curve (5,820 feet radius).

The night was dark, as it was cloudy, but though there had been recent rain it did not actually rain that night.

4. *Description of accident.*—The Down Asansol Pilot (a train used for the collection of loaded coal wagons and the distribution of empties to colliery sidings between Asansol and Raniganj stations) left Nimcha Block Hut at 1/55 hours and proceeded along the down slow line towards Raniganj. On arrival near mile 122, the leading engine (No. 536) with 4 empties, engine 521 and a brake van were cut off and proceeded to the points leading into Searsole No. 2 colliery siding. The rake left behind on the down slow line consisted of 3 empties, 34 loaded vehicles and a rear brake van.

The portion of the train with the two engines was taken clear of the points leading to Searsole No. 2 siding and then backed into Searsole No. 2. Four loaded and one empty wagon (S. I. Railway covered goods No. 499) were attached and the engines and vehicles then went forward again clear of the points.

Engine 536 and four empties were then detached so that the four empties could be subsequently shunted into Searsole No. 2 siding. (*Note*—The reason why S. I. Railway empty No. 499 was taken out of the siding was because there was a restriction in using this venicle for coal loading). Engine No. 521, with brake van, four loaded vehicles and an empty (S. I. Railway No. 499) was then given the signal to back towards the remainder of the rake which was standing on the down slow line. In passing over the points, the leading three vehicles derailed and, as bad luck would have it, 12 Down express passed the rake which was being shunted immediately after the vehicles were derailed as the leading vehicle (No. 499) was only 112 feet from the toe of the switch after the accident had occurred. Vehicle No. 499 evidently came into contact first with the tender of 12 down engine, scraped the side of the leading two passenger bogies and it must then have got moved round with the result that it badly fouled the next four bogie passenger vehicles causing their derailment. The 1st and 2nd class composite bogie, which was the second of the four vehicles which were derailed had its side completely stripped off. The last five vehicles were not derailed but the sides of the vehicle were scraped.

In passing the four empty goods wagons attached to engine 536, which were waiting to be shunted back into the siding, part of the derailed stock of 12 down

passenger crashed into this rake of empties, causing the derailment of the vehicle next to the engine. The impact pushed the four empties and engine 536, forward —a distance of 70 feet.

It was an unfortunate coincidence that the derailment should have occurred just as 12 down passenger was passing but on the other hand it is probable that had the down slow and down main tracks been spaced further apart than 12'—10" the accident might not have happened.

5. *Arrangements for locking points.*—The points are fitted with a Dutton's patent lock fitted to the north stock rail. The normal position for these points is for the down line and in this position the points are securely locked. To release the points it is necessary to insert and turn a key in the lock and, when the points are set for the siding, it is impossible to extract the key from the lock. To remove the key, the points have to be set back to their normal position and the key turned thereby locking the points.

The points are actually operated by an arc lever close by the points. The frame of the arc lever has a recess at either end of the lever's travel into which the drop weight of the catch on the lever can fall thereby preventing the lever from moving. In addition to this precaution for preventing the lever from moving, there are two slots in the frame of the lever. These two slots are so placed that when a cotter is passed through the slot, even if the catch is lifted, the lever cannot move. Normally, that is when the points are not being operated, the cotter is padlocked.

As the key of the padlock is tied to the key of Dutton's lock on the points, the first operation in working the points is to unlock the padlock fastening the cotter, the points lock key is then put in the Dutton lock, where it remains till the shunting operations are over and during which time it is not possible to padlock the cotter as the key operating the padlock is fastened to the points lock key.

In order to prevent vehicles from moving out of the siding thereby fouling the down slow line, a derailing switch is provided, the normal position of the switch being open. There is no trap indicator at the derailing switch nor is there any form of signal at the points leading from the down slow line to the siding. The question as to whether such provision is necessary will be dealt with as a separate question as it is a matter which generally applies to all such sidings and not to this particular siding or this accident.

6. *Cause of accident.*—The accident was undoubtedly the result of the derailment of the wagons which were being pushed back on the down slow line over the points leading to Searsole No. 2 siding, the points being in such a position as to permit the vehicles taking two roads. There are two possible reasons for the points being split :—

(*i*) defect in points ; or

(*ii*) points not having been properly set.

As to (*i*) the Permanent Way Inspector in his evidence states that the points were relaid with 90 lb. E. I. R. section material on 15th of April 1933 and the down line (including the points) was " through packed " on 16th or 17th June last. The Assistant Signal Inspector, who is responsible for the maintenance of the key lock and the point connections, last inspected them on 25th June 1933. Neither of these Inspectors had received any information that the points were not in working order. But apart from their evidence there are other factors which lead me to the conclusion that the points were not defective. Firstly there were no marks on the north switch or its stock rail, nor was there any damage to the toe of the switch to indicate that a flange of a wheel had forced its way between the switch and the stock rail. Secondly the switch rail, if properly set, would be in its normal position *i.e.*, housing into the north stock rail to which the Dutton's patent lock is fitted and whose connections give support to the switch and prevent it from jumping about as a vehicle passes over the switch. Thirdly, the drivers of the two shunting engines had no indication when passing over the points to suggest that the points were in any way defective.

Now in the course of the guards (more particularly guard Rodriguez) and the porter giving their evidence it was noticeable that there was one point which they were anxious to " get off their chest " namely that the cotter was inserted in its slot. The reason for their anxiety was that if they could make one believe

that the cotter was in the slot, then the accident could not have been due to the points not having been correctly set. Rule 3 of the working rules for these sectional coal points states that the pilot guard must satisfy himself that the points are not gaping. It does not say that the cotter must be inserted. What is necessary is that the lever should be pulled right over so that the drop weight of the lever catch can drop into its recess. In this position neither can the points gape nor can the points move unless the drop weight is lifted by operating the lever catch.

The impression which I have (and I think that most of the officers who attended the enquiry formed the same opinion) was that the cotter was not inserted in its slot. What I feel certain did happen was that the lever was not pulled over sufficiently far to permit the drop weight of the catch on the lever falling into its recess and, when the first vehicle (an empty No. 499) went over the points, the point connections vibrated and caused the lever to move, with the result that the points gaped—a type of accident that often occurs. The next vehicle (which was loaded) took the turn out and dragged the empty vehicle, which was ahead of it, off the track. The front pair of wheels of the third vehicle also apparently took the turn out, but the rear pair of wheels took the straight. The other two loaded vehicles remained on the straight.

7. *Staff responsible.*—According to the evidence of guards Ellis and Rodriguez the pilot guard who was responsible for seeing that the points were properly set was guard Rodriguez. At the end of paragraph 6 I have stated that the cause of the accident was, in my opinion, due to the points not having been properly set, I therefore consider that guard Rodriguez showed negligence of duty and is responsible for the accident.

Apart from being directly responsible for the accident, the question arises as to whether Guard Rodriguez could have stopped the shunting movement in time to prevent the accident. The first mark of a derailed vehicle (presumably that of the loaded vehicle next to the empty No. 499) was 5′—2″ beyond the heel of the switch and the centre of this derailed vehicle was 74 ft. further on. Admitting that the speed was slow nevertheless I doubt if 74 ft. was a sufficient distance to pull the train up even if danger signals had been promptly shown to the driver.

8. Prior to the enquiry it came to the Divisional Superintendent's notice that the driver of 13 Up had reported to control, on his arrival at Asansol, that an accident had occurred to 12 Down. The correct course for the driver of 13 Up was to have stopped at the site of accident when he noticed that 12 Down had met with the accident. The driver's evidence is far from satisfactory. The Divisional Superintendent informs me that he will take the necessary disciplinary measures against the driver of 13 Up.

11.—BURMA RAILWAYS.

No. 101 up mixed train running into a motor bus at a level crossing in Kyaukme station limit on the 5th July 1933.

From Mr. E. C. Whelan, Government Inspector of Railways, Circle No. 2-A., Rangoon, to the Secretary, Railway Board, letter No. 489/6-A., dated the 28th September 1933. (4645-T.).

With reference to your letter No. 4645-T., dated the 7th September 1933, I have the honour to forward herewith copies of the proceedings of an Officers' Joint Enquiry into the above accident.

I did not consider it necessary to hold a separate enquiry as the line is unfenced and the Level Crossing is unmanned and the cause of the accident was clearly carelessness on the part of the driver of the Motor Bus.

This is one of the many Level Crossings referred to in paragraph 16 of my Annual Report on Burma Railways for the year 1932-33 as being wrongly classified. In my opinion it is not sufficiently important to be classified as "B" Class but if it is classed as such, it should conform with the Railway Board's Specification, which is not the case at present.

Proceedings of a joint enquiry held at Kyaukme to enquire into the cause of accident which occurred at mile 490/2 L. on the 5th July 1933.

Precis.—At 14-42 hours on 5th July 1933, Motor Bus No. R. A. 9656, collided with engine of 101 Up Mixed at the "B" Class Level Crossing at mile 490/2 L. in Kyaukme Station Limit. Bus Driver, Spareman and Bus Owner were seriously injured. Spareman died on the way to Hospital. There were no other passengers in the Bus.

Finding.—We the undersigned having carefully considered all the evidence in this case do find as follows:—

That the Driver, Maung Pwa, of the Motor Bus, No. R. A. 9656 was solely to blame for the accident as he endeavoured to cross the Railway line in front of an approaching train.

We consider that the brakes on this Motor bus were defective before the accident, and may have been a contributory cause to the accident.

The evidence shows that Driver F. Coutts of 101 Up Mixed, dated the 5th July 1933, was on the alert and whistled correctly before approaching the Level Crossing.

(Sd.) U. TIN,	(Sd.) E. G. TOWNSHEND,	(Sd.) J. M. G. DOOG,
Assistant Traffic Superintendent,	*District Locomotive*	*District Engineer,*
Maymyo.	*Superintendent,*	*Mandalay.*
The 11th July 1933.	*Mandalay.*	*The 11th July 1933.*

The 11th July 1933.

Remarks by the Committee.

We inspected the site of the accident and found that the driver of the motor bus R. A. 9656, had a reasonably clear view of the approaching train proceeding from Kyaukme Station towards Lashio.

2. From the evidence, it had been raining on the morning of the accident but at the time of the accident it was cloudy but not raining.

3. The P. W. D. Standard Road sign posts were found to be in good positions on each side of the crossing and in good order. Although it was raining during the date of this enquiry and during our inspection of the crossing the road surfaces were in good condition with an up grade on each side of the crossing of about 1 in 40. The guard rails were level with the running rails and were of full length.

4. Photographs were taken from the roadway towards the line and from the line towards the roadway. We do not consider that the present traffic over this Level Crossing justifies the provision of gates to Class " B " Standard.

If, however, the authority concerned would pay for two gatekeepers and their accommodation two 12 feet iron gates might be fitted without any further expenditure on roadway over the track and the coupling up of the gates. From local enquiries it would appear that the local motor drivers only pay attention to barriers and road signs are ignored.

It is to be remarked further that the Agent's Last Inspection Notes called for gates to be provided at the Level Crossing at the down facing points Kyaukme, *i.e.*, mile 489/18-19. L where barriers are already erected. The present barriers are across a road which is on a steep gradient rising from the town side (right hand side looking towards Lashio) to the village side. Gates in such a case are far more necessary. We propose therefore that gates should be provided at mile 489/19. L and that the P. W. D. should be approached to close the Level Crossing at mile 490/2. L where the accident occurred.

From an inspection on the ground, we found that the road vehicles could be diverted from the Nansam Road through Kyaukme Village and could cross at mile 489/19. L to get to the town of Kyaukme.

7. The Departmental Officers concerned will take up with the Driver and Guard of 101 Up of the 5th July 1933 and Mr. Wilby, Electrical Inspector, Myitnge, for not attending to the injured persons.

(Sd.) E. G. TOWNSHEND,	(Sd.) U. TIN,	(Sd.) J. M. G. DOOG,
District Locomotive	*Assistant Traffic*	*District Engineer,*
Superintendent,	*Superintendent.*	*Mandalay.*
Manadalay.	*Maymyo.*	*The 15th July 1933.*
The 15th July 1933.		

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1. Mysore Railways.

COLLISION BETWEEN THE REAR PORTION OF No. 21 UP MIXED AND No. 17 UP MAIL AT TARIKERE STATION ON THE 11TH JULY 1933.

LETTER FROM MR. G. C. LAUGHTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, BANGALORE, TO THE SECRETARY, RAILWAY BOARD, No. M.-33|10, DATED THE 19TH JULY 1933 (4647-T.).

In accordance with Rule (7) of Railway Board's Notification No. 1926-T., dated 19th March 1930, I submit herewith my report of the enquiry held by me at Tarikere station on 17th July 1933 into the collision between the rear portion of No. 21 Up Mixed which ran away from mile 7 on the Birur Arasalu branch, Mysore Railways, and No. 17 Up Mail at Tarikere station on 11th July 1933.

Description of accident and locality.

On the 11th July 1933, No. 21 Up Mixed train consisting of one third class bogie, one third class bogie brake, one four-wheeled third and brake, one bogie goods empty and 16 four-wheeled goods of which 14 were loaded and 2 were empty, left Tarikere station, mile 15, on the Birur Arasalu branch of the Mysore Railways, at 20-28. The train was drawn by engine No. 28 M (4-6-0) class with a 6-wheeled tender running engine foremost. The brake power on the engine consisted of a steam brake working on the 6 coupled wheels only, a screwdown brake working on the tender wheels only and a vacuum brake working on the coupled wheels of the engine and on the tender wheels. The train was worked non-vacuum with the goods vehicles leading and the three coaching vehicles in rear, the two coaching bogies being the last two on the train. The brake power on the train apart from side brakes on goods vehicles, consisted of the Guard's screwdown brakes in the two brakevans. The brake power on the train was sufficient, according to the regulations laid down for the class and weight of train on this section. In fact it provided 36 tons of brake power against 20 tons required. The weight of the train was within that allowed on this section for the class of engine employed. From Tarikere station, which is on grades of 1 in 1,000, 1 in 250 and level, the grade rises steadily at 1 in 90 for 3|4 of a mile followed by 1 in 100 for one mile. This is followed by short lengths of 1 in 500 down, 1 in 100 down, level, 1 in 100 up, 1 in 300 down, level, 1 in 100 up, level and then 1 in 90 up for 1¼ miles. From this point there is a fall of 1 in 90 at mile 10 for half a mile and lastly the grade again rises steadily at 1 in 100 for 1½ miles and 1 in 90 for 1¾ miles to Sivapur station (mile 6¼). It was a wet night and the rail was greasy and the engine found difficulty in coping with the load all the way up the steep grades. It managed to get over the small summit at mile 10¼ but the velocity it attained on the short length of 1 in 90 down was not enough to help it to tackle the severe grades beyond and it eventually stalled at mile 7 on the 1 in 90 grade about ¾ mile from Sivapur station, but invisible to that station on account of curves and a cutting.

The guard and driver, after consultation, decided to divide the train and this was done after the 8th vehicle from the engine leaving a load of approximately 83 tons attached to the engine and 167 tons to be held by the brakes. After the division had been made the engine and 8 vehicles went ahead to Sivapur station while the remainder of the train began to move away down the grade and surmounting the peak at mile 10¼ continued its headlong career down the 1 in 90 and 1 in 100 grades till it finally entered Tarikere station where it collided with terrific force with the engine and train of 17 Up Mail waiting on the platform line. Of the 12 vehicles that ran away only 3 remained on the rails and were comparatively undamaged, the remainder were completely smashed and scattered in all directions. The engine of No. 17 Up was badly damaged and derailed, but there was only slight damage to vehicles on that train.

The loss of life was, I regret to say, very high. Eleven were killed on the spot and 19 injured ; of these latter 6 have since succumbed to their injuries making a total death roll of 17. The two coaching bogies in rear of 21 Up were well filled and as these received the brunt of the terrific impact, the loss of life and damage is not surprising. Passengers in No. 17 only received minor injuries, but the two firemen of that train were somewhat seriously injured, the driver who was in the station office at the time escaped. All possible aid to the injured

was rendered by local civil and railway medical officers who were quickly on the scene. Relief specials were run from Mysore and Shimoga and the Agent, Heads of Departments and District Officers were on the scene with commendable promptitude. Though the first two lines in Tarikere yard were blocked it was possible after a short delay to pass traffic by the 3rd and 4th lines and through communication was restored at 2-0 hours on the 12th.

On account of an overbridge and a curve and also due to the fact that the electric headlight on the engine of No. 17 was switched off at the time, it was not possible for the staff at Tarikere to take any steps to avoid any collision by diverting the runaway to another line. In fact no one at Tarikere seems to have seen or heard the runaway till the moment of impact.

Summary of Evidence.

In all 11 witnesses were examined by me and the scene of the collision and the remains of the vehicles were also inspected. Though the bogie brake van was smashed out of all recognition, the four-wheeled brake only had its body smashed while its underframe, gear and wheels and axles were comparatively undamaged. I examined these wheels carefully, the tyres are quite new and show absolutely no flats or signs of skidding nor did the brake blocks show signs of excessive heating as would be expected after running 8 miles with brakes screwed hard on. The conclusion I came to from this examination was that the brakes on this vehicle had not been applied during the runaway. This is confirmed by the evidence of the District Loco. Officer, Mr. Cheluve Urs, who found, 8 hours after the accident, the block of the brake handle in both the brake vans at the bottom of the travel of the thread, *i.e.,* the off position. The block of the four wheeled brake was in this same position when I inspected it and, in my opinion, the damage to the brake rigging is such that it would have been impossible for the block to have been moved to this position after the accident.

The evidence is naturally conflicting. Both the guard and the underguard assert that they screwed down their brakes as soon as the engine stalled and the driver whistled, while, as far as the underguard was concerned, we have the evidence of the train constable (a disinterested witness) that the underguard was never in his brake compartment from the time 21 Up left Tarikere till the smash. Mr. Cheluve Urs' and my examination of the wheels and brakes of the underguard's brake van leads me to believe the latter version as I am confident that these brakes at any rate were never applied. Both the guard and underguard state that when the rear portion of 21 Up started to move off they ran back and tried to get into the 4 wheeled brake van. They state their object in doing so was to release and re-apply the brakes. Why ? The only reason for releasing and re-applying brakes would be if the wheels had started to pick up and skid, but they could hardly have started to skid in the few yards the vehicles would have moved in the time and the condition of the wheels shows that they had not skidded. I am left with the impression that their reason for running back was to *apply* this brake which had not been applied at all up to that time.

As regards the number of wagon brakes applied in the rear portion of 21 Up, all the train crew insist that they dropped and properly pinned down the wagon side brakes on 6 vehicles.

This view is supported by the evidence of Mr. Cheluve Urs, District Loco. Officer, Driver Paroah of 17 Up, and Station Master, Tarikere, only to the extent of the two leading vehicles of the runaway portion and they did not find them properly pinned. They are emphatic that as far as could be seen from the wreckage no more wagon brakes had been applied, certainly not on the next two vehicles from the front.

As regards the testing of the security of the rear portion and the uncoupling, there is distinct contradiction between the statements of the guard and underguard on the one hand and of the driver. The latter is prepared to say that he eased his brakes first to test the security, and again reapplied his brakes and after that he went back to get his authority from the guard and found the coupling hook raised and was not asked to give ' coupling back '. I must disbelieve this statement, which is most unlikely and which is obviously made by the driver in his own defence.

Lastly there is the question of the brake in the guard's compartment which the guard states he applied. On the other hand Mr. Cheluve Urs who inspected the wreckage of this van 8 hours after the smash, is confident that this brake also had not been applied. Moreover it seems inconceivable, that, if the screw

down brake acting on all 8 wheels of a 25 ton bogie vehicle had been properly on, the runaway could have occurred even on a 1 in 90 grade, the wind being, as it was, up the grade, or, at any rate, movement would have occurred so slowly that the guards could have caught up their vans. I therefore conclude that this brake also was not applied and all the precautions taken by the train staff was a perfunctory dropping of a few wagon brakes and when the driver backed to ease the coupling the rear portion of the train moved off briskly.

As regards the condition of the brakes in the two vans, the stock in question runs regularly between Birur and Shimoga daily and is inspected at both these stations by competent staff, there is, to my mind, no doubt that these brakes were in order, moreover the guards both state that they had used these brakes on at least 3 occasions on that particular run and that they acted properly.

Conclusion.

I must come to the conclusion that the cause of the runaway and subsequent collision was due to the brakes in the brake vans having not been applied when 21 Up stalled at mile 7 and to no other adequate steps having been taken to secure the rear portion of the train from moving as required in General Rule 170 (*a*). For this I hold guard N. P. Prasad responsible. Further I hold driver Sivanand responsible in that he accepted the authority to move the front portion of the train from Guard N. P. Prasad before he and the guard had both satisfied themselves that the portion of the train left behind was properly secured against movement, as required in Mysore Railways Subsidiary Rule 170-B to the General Rules.

As regards brakesman Nagaratnam, he was under the orders of guard N. P. Prasad and the latter so far lost sight of his responsibilities that he allowed Nagaratnam to travel with him, instead of in the latter's own compartment. I only hold brakesman Nagaratnam responsible in a minor degree.

Recommendations.

It is difficult to make recommendations in this case. The rules in force and the safety appliances provided were ample to have prevented the accident occurring. There remains, as always, the human element. If staff will not obey rules and use the appliances provided, accidents must perforce occur.

One further safety appliance which would have prevented this accident, in spite of any delinquencies on the part of the staff, is the fitting of vacuum brakes to metre gauge goods stock. It has been done in the case of broad gauge goods stock and has been well worth the expense, and, in my opinion, it is high time the use of the vacuum brake were extended to the metre gauge goods stock. It is, I think, specially important on the metre gauge lines in South India which all have to work over severe gradients.

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2. Great Indian Peninsula Railway.

DERAILMENT OF 16 LOADED WAGONS OF No. M. 45 UP GOODS TRAIN AT MILE 561|14 ON THE AMLA-PARASIA SECTION ON THE 27TH SEPTEMBER 1933.

LETTER FROM MR. R. H. IRANI, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, TO THE SECRETARY, RAILWAY BOARD, No. 1606, DATED THE 14TH NOVEMBER 1933. (4793-T).

I beg to submit a report on the Enquiry held at Bordhai on the 4th October 1933, by the District Officers to investigate the circumstances leading to the above accident. After I saw their report and finding I myself held further enquiries at Amla on 10th November 1933.

Description of Accident.

2. M. 45 Up of 27th September 1933 worked by Engine No. 1313 type H.-4 left Junnor Deo for Amla with engine and one brakevan only. At the next station Hindargarh, a load of 44 wagons, all loaded with coal, was attached, and a banking engine was attached in the rear. This train then left for the next station Nawegaon which is at the top of the incline. The banking engine was detached here and the train proceeded towards the next station Bordhai, 10 miles away. After travelling for about 9 miles *i.e.*, about one mile from Bordhai sixteen wagons were derailed at mile 561|14. After the accident it was noticed that the train had parted, the first 24 wagons and the engine having come to a

stand 1,500 ft. from the rear portion. The 24th vehicle *i.e.*, the last one of the front portion was completely derailed and the first fifteen of the rear portion were all derailed, capsized or telescoped. This wreck of 15 wagons heavily loaded with coal lay jumbled together in a length of about 200 ft. along the track and thrown 10 to 15 ft. to the left of it (ordinarily these 15 vehicles would cover about 350 ft. of the track). The front draw bars of the 25th and 26th vehicles were fractured, that of the 25th vehicle lying on the track 15 ft. ahead of it with its coupling.

3. The track under the wreckage was demolished and the 1,500 ft. of track between the two portions of the train had the tie-bars of sleepers damaged by the derailed 24th vehicle.

4. The total cost of the damage to permanent way and rolling stock is estimated to be Rs. 32,377.

Description of Locality.

5. The track which is on a low bank at the site of the accident consists of 82 lbs. B. H. steel rails on C. I. pot sleepers. It is on the straight at the site of the accident and for about 1,800 ft. behind it. Excepting under the wreckage there was no mark of the derailed wheels on the track behind it. The first discernable mark of derailment was under the wreckage and about 200 ft. behind its front wagon. The gauge of the track behind the wreckage varies from exact to 1|4 inch. slack and the cross levels were found to be correct. The site of the accident is on 1 in 100 down grade, which extends to about 1,700 ft. behind the wreckage.

6. The train consisted of the engine, 44 wagons loaded with coal and a brake van, the gross load behind the engine being 1,296 tons. It was provided with automatic vacuum brake throughout. The weather was fine on the day in question.

Evidences and Conclusion.

7. From the evidence given by the Banking Engine driver it is clear that the hose pipes of all the vehicles on the train were coupled and that the train was running with through automatic brake from Hindargarh to the site of the accident. This is also corroborated by the leading driver's statement that he saw the vacuum gauge needle drop to zero when he felt the 2nd jerk and also by the guard that he saw the gauge showing lower vacuum when running down grade. The fact that the rear hose pipe of the 23rd vehicle was noticed to be on the dummy by those who came on the scene of accident about 4 hours after the accident, does not mean that it was in that position all the time before the accident. The Banking Engine driver never created vacuum. Had he created vacuum for the 22 vehicles in rear of the 23rd vehicle, the brakes of all these vehicles would be binding hard after he was detached at Nawegaon and the leading engine could never have started from Nawegaon 2 minutes after it with 45-1296 tons load of which 22 wagons were braked. Moreover the front coupling of 24th vehicle was hanging and not on the dummy, indicating that it must have been coupled with that of the 23rd vehicle before the accident. I therefore am of opinion that the rear coupling of the 23rd vehicle was placed on the dummy by some one after the accident, as it was inevitable that the first 23 vehicles, which were not derailed, had to be worked into Bordhai Station.

8. The question then arises how and when did the train part. There are two witnesses who do not belong to the Railway ; both of them aver to have seen the train parted before the derailment, but both of them say the distance between the two portions was only 5 ft. on two different occasions. The first of these two witnesses saw the train parting at about mile 562|4, *i.e.*, on the up grade of 1 in 400 and the second one saw them travelling one after the other at about 561|16 also 5 ft. apart. On my questioning them informally I gathered that the keyman of the gang approached the first witness to give evidence and that the 2nd witness was also asked by some Railway staff to come forward to give evidence as his land is near the site of the accident and he must have seen the accident. The guard says that he got the first jerk after he passed the cutting, *i.e.*, at about 561|21, which does not agree with the site of train parting as given by the 1st witness mentioned above, and I do not believe that the two halves should have been travelling so close to each other before they collided. Moreover the train could not have parted on the up grade at mile 562|4 as the driver never touched his regulator on this run, nor could it be conceived how it could part coming from the flat up grade on to the down grade when he applied

his brake steadily to control the speed. The above-mentioned 2nd witness says that when he first saw the train the distance between the two halves was 5 ft., and 3 seconds afterwards they collided, which means that the difference in their speed was less than 1 mile per hour. This would give merely a mild shock without the rear portion crashing as it did.

9. The way in which the fifteen wagons capsized, telescoped and piled on each other goes to show that the collision if there was any, must have been a very violent one ; on the other hand I am assured that there was no sign of damage to the buffers or the head-stocks of either the 24th or 25th vehicles which are supposed to have come in contact.

10. Also the train being through automatic, the two portions would have come to rest soon after parting instead of the latter half gathering speed to collide with the front portion.

11. I am therefore of the opinion that the train did not part before the derailment of the wagons and that the two outside witnesses were brought in by certain interested staff to give the above evidences.

12. After the driver brought the train under control by applying the brake on top of the 1 in 100 grade, it must have been free-wheeling down the grade at about 25 miles per hour when the first lurch was experienced by the train staff. This lurch, in the circumstances explained in the foregoing paragraphs, I cannot attribute to anything but the first derailment of the 25th wagon No. 13483 G. I. P. at the point about 200 ft. behind where it was lying. This derailed wagon heavily loaded with coal was hauled and pushed by the heavy loads on either side running down the steep grade and must have toed into the bank in a short distance when its front draw bar snapped. It was at this moment that the 2nd heavy jerk was experienced by the train staff and the driver states he was thrown forward by it ; (had it been a case of collision he would have been thrown backward). By the heavy momentum of the coal loaded wagons behind the derailed 25th wagon the following wagons capsized or telescoped. There is also a distinct indication of the 24th wagon being derailed by the side pull from the 25th derailed vehicle. The reason why the front portion travelled as much as 1,500 ft. after parting and automatic braking is the gravity down the 1 in 100 grade and heavy unbraked goods loaded in all the wagons.

13. My conclusion is that the 25th vehicle first derailed due to its either being defective or having run over an obstacle ; a broken part of its gear may have dropped on the rail which probably was mixed up with the debris.

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3. South Indian Railway.

COLLISION BETWEEN No. 10 PASSENGER TRAIN AND A GOODS TRAIN AT TAMBARAM STATION ON THE 13TH OCTOBER 1933.

LETTER FROM MR. G. C. LAUGHTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, BANGALORE, TO THE SECRETARY, RAILWAY BOARD, No. S.-33|475, DATED THE 23RD OCTOBER 1933. (4761-T.)

In accordance with the orders contained in Railway Board's notification No. 1926-T., dated 19th March 1930 I have the honour to submit a report of the enquiry which I held at Tambaram station, South Indian Railway, on 17th October 1933, into the circumstances which led to the collision between No. 10 Passenger train and the 4|30 hours Goods train at that station at 5-15 hours on October 13th, 1933.

Description of Accident.

At 5-15 hours on 13th October 1933 when the recently formed 4-30 hours goods train which consisted of 18 bogie vehicles, 13 four-wheelers and one four-wheeled brakevan, 7 four-wheelers only loaded, total weight 355 tons, had been placed partly on the Down Suburban line and party *via* the cross over on the main line, prior to departure for Madras Beach, it was run into from the rear by No. 10 Trivandrum Fast Passenger, consisting of one M class engine (BESA 4-6-0 type) and 11 bogie coaching vehicles, 6 goods vehicles were capsized and badly damaged, 3 more were derailed and damaged, the engine and leading bogie vehicle of the Passenger train were derailed and damaged. The weather was clear but dark. Fortunately there was no loss of life, but 20 passengers in No. 10 train (of whom 13 were railway servants) and all 3 of the

engine crew of that train received slight injuries. The injured persons were promptly attended to by the Railway Apothecary at Tambaram, and none was detained in hospital.

The damage to rolling stock, permanent way and signalling is estimated at Rs. 29,000 approximately.

Description of the locality of the accident.

Tambaram is a station on the metre gauge section of the South Indian Railway situated 18 miles South of Madras Beach. It is a roadside station of the single steam main line, but forms the southern terminus of the double electrified suburban lines. The general direction of the lines is North-South. There are 4 platform lines in the passenger yard which are, from west to east, Up Suburban (road 4), Down Suburban (road 3), Main Line (road 2) and Loop Line (road 1). Further to the east is the Goods Classification yard which is entered by connections from the main line at both ends of the yard, but at the time of the accident the entrance at the north end was out of use, and entrance to and exit from the goods yard was being effected over cross-over No. 9 at the south end, which forms the outermost facing points at that end. The next points on the main line further north are cross-over No. 8 leading to the loop line (road 1) and then comes cross-over No. 19 leading to the Down suburban line (road 3). The two suburban lines (roads 3 and 4) end in dead ends, and the two passenger platforms, which are islands, are situated between roads 1 and 2, 3 and 4 respectively. The signalling is up to date and of the colour light type, only recently installed, with power working for both points and signals. The passenger yard is fully track circuited in accordance with modern practice. All stop signals except the outers have two aspects red and green, while the outers are of the 3 aspect type red, yellow and green. Shunt signals are of the position light type.

The home signal at the south end of the yard is of the triple bracket type, the left hand and highest bracket (3RA) being for the straight main line (road 2), the centre bracket (3RB) refers to the loop line (road 1) and the right hand and lowest bracket (3RC) refers to the goods yard. It is situated 600 feet from the outermost facing points (No. 9).

The outer signal (4R) is situated 1,320 feet south of the Home signal.

The first track circuit at the south end extends from the outermost facing points No. 9 to facing points No. 8 and the occupation of this track holds 4R at danger, but conversely as this track circuit ensures the line for an adequate distance beyond the outermost facing points being clear, the outer signal is "free" and can be taken off irrespective of the position of the Home signal though it will only go to yellow unless the Home, Starter, and Advanced Starter, for the main run through line are off when it will go to green. The track circuits further north on the main line, five in number and extending to 600 feet beyond the outermost facing points at the north end of the yard all control the main line Home signal (3RA) which cannot be taken off if any of them are occupied.

The power signalling though only recently installed on the Madras (Beach)—Tambaram section, has given a great deal of trouble owing to faulty cables which are now in the process of being renewed by the contractors under the terms of their contract. This work of renewal had not reached Tambaram, and the defects at that station had necessitated some modifications of the interlocking. These modifications entailed the entrance to the goods yard at the north end being thrown out of use entirely, the points of cross-over No. 19 being worked locally by hand, certain shunt signals being out of use and finally the green aspect of the outer signal 4-R being suspended. Apart from these modifications all detections between points, signals and track circuits were in use, and stated to be in order at the time of the accident.

Evidence.

As statements of the staff concerned had only recently been recorded by the District Traffic Superintendent in most cases and by the Loco. Foreman and Train Examiner in the case of the engine crew of No. 10, I did not consider it necessary to record fresh statements *de novo*, but each witness's statement was read through by, or read over to him, and accepted, while I elicited such further information from witnesses, as I thought necessary.

Comments on the Evidence.

About the aspect of the Outer signal 4-R as No. 10 approached it, there is no conflict of evidence, all the train crew agree that it was showing yellow and the signalman states that he pulled it off as he was quite entitled to do under the working rules, and as he could do provided the track between points 9 and 8 was unoccupied, but as no home signal had been taken off the Outer would only show yellow and this aspect was recorded by his return indication. The driver was therefore entitled to pass this signal cautiously and be prepared to stop at the next signal, the home signal. That he exercised this caution is not borne out by the fact that the collision occurred at any rate 2 minutes before his due arrival at Tambaram, having left Vandalur right time (*i.e.*, he had made up 2 minutes in a run of 3½ miles) and by the results of the collision which are consistent with a speed of 20—25 miles an hour at the moment of impact; in this connection it is significant that there is a raising gradient of 1 in 241 from beyond the outer signal to inside the home signal. As regards the aspect of the home signals the train crew of No. 10 state that the main line home signal 3RA was showing green, while the Signalman states he did not, and in fact he could not, pull it off owing to the occupation of track circuits north of points No. 8, nor was it possible for him to have pulled off the loop home 3RB as that line was occupied by No. 1041 Goods. The return indications of all his home signals were showing red.

In support of the Signalman there is ample evidence that the stock of the 4|30 hours goods when placed on the Down Suburban line fouled the cross over No. 19 and even points No. 8. This must have been so as the length of the goods train without its engine was 1089 feet, and the length of the Down Suburban platform line from the starting signal at the north and (15R) to the cross over points 19 is only 648 feet. The position of the engine of No. 10 and the wreckage after the accident also confirm this. This being so, certainly 2, probably 3, different track circuits were occupied by the stock of the goods train, the occupancy of any one of which would have held home signal 3RA at danger, unless the electric locking had entirely failed. There is no evidence to support this latter possibility, such failures as have occurred at this and other power operated cabins have been of the ' safety ' type, *i.e.*, the result has been merely delay to traffic and no dangerous conditions have been set up. It is true that the cabling has been found defective throughout this section and tests at Tambaram have been carried out to try and get the green aspect on Home signal 3RA with the controlling tracks occupied by attempting to induce short circuits and leaks in the cables, but without success, and I see no reason therefore to think that the electric detection on all tracks had failed.

As regards the ' free ' outer I was given to understand that it was not used a great deal at this station, and neither Driver Pillai nor Guard D'Cruz of No. 10 had experienced being stopped at the Home signal after getting a yellow indication on the Outer, and in this case they were obviously not expecting to be stopped at the Home. Its use on this occasion was questionable since so much of the main line was obstructed by the tail of the Goods train. However working rules and the track curcuiting permitted its use, and Signalman Subbiah cannot therefore be blamed for making the use of it that he did.

Finding.

I regret that I cannot accept the version of the train crew that the Home signal 3RA was showing a green aspect when No. 10 approached it. The balance of evidence is against this, and I therefore hold Driver P. Packirisami Pillai responsible for the accident by passing Home signal 3RA at danger thereby committing a breach of General Rules 76 and 78.

As Fireman S. Natesa Mudaliar and Guard D'Cruz state that they were observing signals they must also take some share in the responsibility for the accident.

Recommendation.

' Free ' outers, except at busy junctions with permanent speed restrictions, and where steep grades render it undesirable to hold a train at them, are in my opinion, a potential source of danger, and their use should be discouraged. They would appear to be unnecessary at a station like Tambaram, where the delay involved in holding a train at them rather than at the home signal would be negligible.

4. East Indian Railway.

COLLISION BETWEEN No. 161-A UP EXPRESS GOODS AND No. 162-A DOWN EXPRESS GOODS AT HARTHALA STATION ON THE 29TH JANUARY 1934.

LETTER FROM MR. A. I. SLEIGH, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, No. 730|XIII|34, DATED THE 19TH APRIL 1934. (4871-T.).

The enquiry on this accident was held by a committee of Senior Officers on 19th February 1934 and subsequent days ; the reason for the delay in holding the enquiry was due to the drivers of the two engines reporting sick and not resuming duty till 13th February. In enclosing the proceedings of the enquiry I have the following remarks to make :—

(*i*) *Description of the accident.*—At about 22|15 hours on the 29th January 1934 while No. 161-A Up Express Goods was coming to a stop on the loop line at Harthala station, in order to cross No. 162-A Down Express Goods, the driver of the latter train ran against signals and caused a head-on collision with No. 161-A Up. The first ten vehicles on 162-A Down Goods were capsized, of which only one vehicle (a T. R. Van from Saharanpur) was loaded. Two wagons immediately behind the capsized vehicles were derailed. The engines of both trains were damaged and the engine crews, with the exception of two men, sustained minor injuries. The loop line was damaged for a length of about four rail lengths. The total cost of damages is about Rs. 28,362 of which Rs. 26,000 is the estimated damage done to the capsized vehicles.

The relief train which was returning from an accident at Nagina, arrived at Aghwanpur at 22|42 hours and the engine was sent light at 23|00 to pull back the rear undamaged portion of 162-A Down to Aghwanpur : this was done at 0|07 hours. The relief train then proceeded at 0|29 to Harthala arriving there at 1|03 hours. In the meantime an up light engine from Moradabad was sent out at 0|38 arriving at Harthala at 0|55. This engine drew the load of 161-A Up back into Moradabad at 2|45 hours. The disabled engine of No. 161-A Up was drawn back to Moradabad at 9|50 hours. The main line was cleared at 11|40 hours and No. 49 Up passenger was received at Harthala at 11|45 on 30th January 1934, from which time through running *via* the main line was resumed.

(*ii*) *Description of the locality.*—The point where the two engines collided was about 400 ft. from the centre of the station building and close by the Saharanpur end of the rail level platform. The station is a two line station with bracketed home signals and outer signals at each end of the station.

(*iii*) *Cause of accident.*—That the signals were against 162-A down there can be no doubt for the reason that the up loop home slide was found by station master (R. K. Misra) to be pulled when he came to the station after the accident had hapepned ; further, driver Ismail of 162-A Down goods in his evidence does not try and make out that the signals had been lowered for his train—his statement was to the effect that he was unable to pick up any signal when approaching Harthala station on account of the fog, a factor which is also clear from the evidence. The only point on which there is any doubt is whether fog signals had been put on the rail outside the down outer signal. The evidence of the station staff is to the effect that fog signals had been placed on the line. The driver and fireman of 161-A Up goods train state that their train exploded two fog signals on approaching Harthala station, and, after the fog signals were exploded, the driver noticed that the Up outer signal was off and, when passing the loop home signals, he noticed that this signal was off too. The guard of 161-A Up goods train said he did not hear any detonators explode and the guard of 162-A Down goods stated that he did not hear any fog signal explode at Harthala nor at the previous stations (Matlabpur and Aghwanpur) at which stations the driver of 162-A Down goods states he did explode two fog signals.

Even if the driver of 162-A Down Goods is given the benefit of the doubt in regard to his train not having exploded the detonators, his train took the turn out at Harthala station and, on his own evidence, he states that he immediately tried to stop the train when his engine took the turn out. Since the distance from the facing points to the point where the two engines met is 1,037 ft. and the train was fully vacuumed, it is obvious that, if he did apply his brakes, shut off steam and reversed, his train would have been pulled up

before it collided with 161-A Up or any way, the effect of the collision would not have been what it was.

I discredit driver Ismail's evidence and I am of the opinion that fog signals were placed at the prescribed distance beyond the down outer signal and that these fog signals were exploded by 162-A Down Goods. I hold the driver of 162-A Down Goods solely responsible for the accident in that he did not take the precautions laid down in General Rule 81 in regard to the duties of a driver when an engine explodes a detonator and, in consequence, he passed the outer and home signal at danger which resulted in his train colliding with 161-A Up Goods as the latter train was on the point of coming to a stop at Harthala station.

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5. H. E. H. the Nizam's State Railway.

COLLISION OF No. 352 DOWN GOODS TRAIN AND AN UP LIGHT ENGINE AND BRAKE VAN BETWEEN RECHNI ROAD AND ASIFABAD ROAD ON THE 20TH FEBRUARY 1934.

LETTER FROM G. C. LAUGHTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 7, BANGALORE, TO THE SECRETARY, RAILWAY BOARD, No. N.-34|8, DATED THE 7TH MARCH 1934. (4903-T.).

In accordance with Railway Board's letter No. 1926-T., dated 19th March 1930, I have the honour to submit herewith my report of the enquiry held by me on 25th February 1934 at Rechni Road station and subsequently at Kazipet on 25th February 1934 and Secunderabad on 26th February 1934 into the circumstances which led up to the collision of No. 352 Down Goods and an Up light engine and Brake Van, which occurred at about 17|15 hours on 20th February 1934 at mile 291|10, roughly half way between Rechni Road and Asifabad Road stations on the Kazipet-Balharshah single line section, broad gauge, of H. E. H. the Nizam's State Railway.

Description of Accident and Locality.

The trains concerned in the collision were No. 352 Down Goods (a daily train) consisting of 41 (=42) loaded goods vehicles and a 4 wheeled brake-van weighing in all 1,005 tons behind the tender hauled by an ' XD ' class engine and tender weighing 161.6 tons in working order, and another ' XD ' class engine with a 4-wheeled brake-van, weighing 11 tons, attached. The vacuum brake was working throughout both trains. The single line section Kazipet-Balharshah is worked on the Absolute Block System with Morse speaking instruments (paper-line clear).

The scene of the collision at mile 291|10 is roughly half way between Rechni Road (mile 286½) and Asifabad Road (mile 295¼) stations and is on a falling gradient of 1 in 100 towards Asifabad Road and on a curve of 1° radius left handed looking towards the latter station. The up direction is from Rechni Road to Asifabad Road. From Rechni Road the line rises fairly steadily on gradients of 1 in 100 and 1 in 175, intermingled with short lengths of level and a fall of 1 in 100 for about 1|5 mile, to mile 289, it is then level for about ¾ mile and from 289¾ it falls steadily, mostly at 1 in 100 except for short lengths level, right into Asifabad Road station.

At the spot where the collision occurred the line is in slight bank and is bordered by thick forest on both sides. On account of the forest and the curve the visibility of trains approaching the spot is limited to not more than about 1,000 feet on either side.

As the result of the collision the driver, fireman and guard of the Up light engine and brake-van sustained minor injuries necessitating medical treatment, but the engine crew of 352 Down (which had actually stopped before the moment of impact) jumped clear and were not injured nor was the guard of that train who remained in his van. The damage to the engines and one brake van was considerable, to other rolling stock and permanent way slight, the total being estimated to cost Rs. 8,000. The line was obstructed for about 19½ hours, meanwhile transhipment of passengers, mails and parcels was effected. The driver of each of the trains involved had in his possession what appeared to be a perfectly correct line clear ticket, which were taken possession of by the first Railway officer on the scene, as were the line clear books and private number

sheets of the stations at either end. These were examined by me at the enquiry and it is significant that the private numbers shown in the two enquiry books and on the line clear tickets are in each case 42, while no such number appears in either of the private number sheets at either station, at the same time the reply books at either station are blank and do not show that line clear was ever asked or given for either train, nor any private numbers allotted.

Evidence.

The original statements made by the staff concerned were read over to and acknowledged by them. I also examined the damaged engines in Kazipet shed on 25th February 1934. Their front ends are considerably damaged, but it is difficult to estimate the relative speed of impact, but I think it can be put at not more than 10 miles per hour or the damage would have been greater.

Summary of and comments on the evidence.

No blame can attach, I consider, to the train staff of either train. Both drivers had received what appeared to be perfectly correct line clear tickets, in one case also examined by the guard, in the other not examined because 352 ran through Asifabad station picking up line clear. They were therefore quite entitled to proceed on their way and apart from the ordinary precautions of looking ahead neither could have suspected that there was another train in the section.

We have now to deal with the evidence of the two Station masters and the Section Controller. The latter's evidence is at variance in many respects with that of the Station masters, but this may be partly accounted for by the natural difficulty of recollecting afterwards conversation on a telephone. I got the impression, however, that K. Ramiah, the Section Controller, did not have quite that grasp of the position as regards the two trains in question that he ought to have had. I am told however that his section, Bezwada—Balharshah with colliery branches, is a heavy one, and it is not usual for him to give definite orders and in advance as to where two particular goods trains are to cross, unless appealed to by one or other station. It is to be noted that he states that he thought the crossing of these two trains should have been at Asifabad which may or may not have any bearing on the fact that 352 Down was run through on the loop line. Whatever action the Controller did or rather did not take can never relieve Station masters of their sole responsibilities of working strictly to rules as regards asking and giving of line clear. That these rules were definitely broken by both Station masters is clear from the fact that nothing is recorded in their reply books and the private numbers on the line clear tickets (in both cases 42) were not allotted from their private number sheets. It should be noted further that the times of *both* enquiry messages are the same 16|50 and both alleged reply messages are also the same, *viz.,* 16|52. This is possibly a mere coincidence, but it goes further to prove how false at least the replies were. The coincidence here ceases as the up engine and brake is shown in column C. of Rechni Road's enquiry book as having left that station at 16|55. This message is shown as acknowledged by Asifabad. In spite of this Asifabad started 352 Down at 17|9 according to column C. of his enquiry book, this message apparently also being duly acknowledged by Rechni Road. Thus the two Station masters quite complacently allowed two opposing trains into the same section and acknowledged quite happily that they have done so ! The evidence of the two relieving Assistant Station masters who were present in the offices at Rechni Road and Asifabad respectively at the time do not help, as each denies hearing what messages were exchanged on the Morse instruments. The question is how did they arrive at these private numbers ? The only solution possible, to my mind, is that these two men had reduced the exchange of line clear messages to such a state of abbreviation that they never signalled their enquiries at all, but merely tried to obtain private numbers by some garbled code of their own. It was here that the slight defect in Rechni Road's instrument probably found them out, and, in signalling some sort of an enquiry, ' 42 ' must have come through, this was taken as the required private number by, say Rechni Road for his train and acknowledged by repetition to Asifabad who in turn took it for the private number for his train and thus both trains were started on line clear tickets bearing the same private number, each man thinking that the other was giving line clear. All this means in fact that columns A. (enquiry) and B. (reply) of their " enquiry and line clear " books were to all intents and purposes forgeries for these messages were never actually signalled or there would have been the corresponding records in the " reply " books at the other end. Station master, Rechni Road, had even gone further and forged

column ' D.' ' in report ' in his book which stated that the Up engine and brake arrived at Asifabad at 17|15 when it never got farther than the scene of the collision ; his excuse for this is most unconvincing.

There remains the question of the defect in the instrument at Rechni Road. I was not convinced by Mr. Ross's evidence that the standard of maintenance in his department was particularly high, on the other hand the defect in the Rechni Road instrument appears to have been intermittent or presumably that Station master would have made further complaints apart from the one he did on 14th February 1934 and the refusal to sign the lineman's memo.

I am convinced, however, that had one or other of those line clear enquiries been signalled in full according to rules, the accident would not have happened, since there would have been a record in the corresponding reply book and a proper allocation of a private number while the other enquiry message would have been in a different form as the last opposing train would have been a different one, and it would not have been sent at the time it was alleged to have been sent. On the other hand, if the Rechni Road instrument had been so defective that properly signalled enquiry and reply messages were not clear, one or other of the Station masters would have suspended Morse working and obtained line clear through control. I am therefore convinced that these messages were never signalled at all and it seems probable that the spurious private number was obtained as surmised earlier.

Finding.

Having carefully considered the evidence tendered at my enquiry and previously, and having examined the line clear books and tickets,, I must disbelieve the statements of Station master Y. Sitaramiah of Rechni Road and Assistant Station master M. Narasannah of Asifabad Road and hold them both equally responsible for the collision of No. 352 Down Goods and an Up engine with brake van attached at mile 291|10 on 20th February 1934 in that they failed to carry out G. R. 374 and H. E. H. the Nizam's Railway Subsidiary Rule 375 (4) of the Indian State Railway General Rules.

Recommendations.

Though one may find these two individuals responsible in this particular case, it is notorious that staff systematically disobey or only partially obey these rules. It is therefore in the interests of public safety to minimise such breaches by the provision of more modern appliances.

The Kazipet—Balharshah section of H. E. H. the Nizam's Railway can no longer be considered a branch or unimportant section of line seeing that it carries fast traffic in the form of the Grand Trunk Express and at times a considerable volume of goods traffic. It is, in my opinion, time that some form of modern single line block instruments were installed on this section.

L10RB—450—25-5-34—GIPS

13 APR. 1935

PRB RA/16.

Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

which occurred during the

Half year ending the 30th September 1934

No. 16

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EAST INDIAN RAILWAY.

DERAILMENT OF 3-UP BOMBAY MAIL, AT MILE 414/19 BETWEEN GANJKHWAJA AND MOGHALSARAI ON THE GRAND CHORD SECTION, ON 26TH OCTOBER 1933. (Relating to half year ending 31st March 1934.)

FROM MR. A. I. SLEIGH, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 2039/XIII/33. DATED 26TH NOVEMBER 1933. (C. No. 4768-T.).

I held the enquiry on the above mentioned accident on 30th and 31st October 1933 at Moghalsarai. The finding which I have come to in paragraph 4 is the result then of an attempt to piece together the evidence of the staff who were actually on the train, and of the staff who arrived shortly after the accident, with certain points which came to notice at the enquiry. Mr. Rodwell, Deputy Chief Engineer of this section of the railway, was the first engineering officer to arrive at the site of the accident as he was at Moghalsarai (about 4 miles away) when the accident happened.

The Chief Mechanical Engineer, Mr. Ray, arrived at Moghalsarai on the morning of 27th October and made various investigations as to the cause of the accident.

2. *Description of the Accident and Locality.*—At about 6-38 hours on 26th October 1933, No. 3-Up Bombay Mail derailed at mile 414/19, between Ganjkhwaja and Moghalsarai stations on the Grand Chord Section of the East Indian Railway. In consequence of the coupling hook of the first vehicle snapping, as the result of the accident, the engine (XB Class No. 1909) got separated from the train and pulled up just beyond the tangent point at the Moghalsarai end of the curve at a distance of 282 feet from its train. The leading front pair of wheels of the engine bogie truck remained on the track as also the right hand wheel of the radial truck; the remaining wheels of both the engine and tender derailed towards the inside of the curve. According to Mr. Kilroy, a Permanent Way Inspector who was travelling in the train on leave, the rear right hand coupled wheel was also on the rail; this is not corroborated by any other of the witnesses who gave evidence, but this does not however, imply that his statement is incorrect. I mention this point as it helps to substantiate the conclusion made later on that the engine was dragged off the line by the vehicles behind getting derailed.

The train consisted of 7 bogie vehicles all of which were completely derailed. The first vehicle was capsized into a borrow pit, with the roof actually in the borrow pit: the bogies of this vehicle were detached from the vehicle. The next two vehicles were tilted over. The centre of one end of the body of the last vehicle was 16′ 0″ away from the centre line of the Down track and that of the other end 15 feet, so that, taking into consideration the fact that the track centres are about 16′-4″, the last vehicle had moved towards the adjoining track. The position which the derailed train assumed was, at one time, that of an arc of a circle:

the arc became truncated when the coupling hook of the first vehicle snapped. The distance of the ends of the body of the first vehicle from the down line when the train came to rest was 39′-9″ and 46′-3″, for the next vehicle 45′-3″ and 47′-9″, for the third vehicle 53′-9″ and 51′-9″, for the fourth vehicle 49′-9″ and 35′-9″, the last three vehicles curved back to the centre line of the up track.

The track consisted of 88½ lb. B. H. rails re-laid at the beginning of this year on n+3 sal sleepers with C. I. chairs and mostly Stewart keys. The alignment is on a 2° curve (radius 2865 ft.) and the chairs are double spiked on the outside of the outer rail. The track was fully ballasted with stone ballast and the outer rail had 4″ of superelevation which is what has been prescribed for trains travelling 50 to 55 miles per hour. The height of bank is about 3 feet and the country around is flat.

Twenty passengers were injured, only two severely. Medical aid and the relief train arrived from Moghalsarai at 8-40. Single line working was introduced at 9-20 which was about the time when the passengers and injured were removed to Moghalsarai by 1-Up Mail. Double line working was resumed at 19-40 hours on 27th October 1933.

3. *Items of particular significance.*—The following points are the bases on which I come to certain definite conclusions:—

(*a*) *Splashings of white metal*—These were noticed by Mr. Rodwell, Deputy Chief Engineer, on the ballast and chairs at the beginning of the curve (mile 414/3 about), and at various points along the curve up to the end of the curve (mile 414/22). These splashings adhered to the stone ballast and did not resemble filings from the rail due to rail wear. As these splashings extended to the end of the curve it appeared likely that they had come from the engine or its tender, or possibly from the leading bogie of the first vehicle as this bogie almost reached the end of the curve. Divisional Superintendent's plan No. 20054 shows that an axle box back shield was found at about mile 414/7. This axle box shield was picked up on the day after the accident and, from the enquiries I made subsequent to the enquiry, I understand that this axle shield did not belong to any vehicle on 3-Up Mail. The brasses and axles of the vehicles, engine and tender were all examined but there was no sign of a hot axle, nor can any information be obtained of a vehicle or engine having recently passed over this section of the line and having arrived at Moghalsarai Junction (where train examination is done) with a hot axle. This is somewhat extraordinary as the indication was that the metal had recently spilt out of an axle box while an engine or vehicle was going round the curve. It would appear then as if the possibility of the derailment being caused by a hot bearing cannot be further considered, particularly so as the report from the Government Test House at Alipore on the splashings is as follows:—

Glistening metallic particles.

Tin	***Nil.***
Lead	***Nil.***
Iron	**Present in large quantity.**
Manganese	**Present in small quantity.**
Zinc	***Nil.***

The white glistening metallic particles consist of iron (steel).

How steel or iron should have got deposited on the ballast as it was most mysterious.

(*b*) *Condition of track.*—The driver and guard of 913-Up goods (the train which travelled over this portion of the line about two hours before the accident), noticed nothing wrong with the track. Nor did the driver of 7-Up who passed mile 414/19 about four hours before 3-Up Mail; this driver also stated that he has not heard any drivers complaining about this curve, which statement is practically corroborated in the evidence of driver Eden (the driver of the train in question). After the accident several witnesses noticed that the track was distorted at mile 414/12 to 414/14 and again for a length of about 220 feet near mile 414/19.

Mr. E. S. Linton (Permanent Way Inspector of Moghalsarai) who, though not in charge of the particular section, arrived at the site about one hour after the accident, mentions in his statement that, at the point of derailment and for a distance of 3 sleepers short of the point of derailment, the gauge was 1/16″ slack. For a distance of 27 sleepers beyond the point of derailment the gauge was correct but, though the gauge was correct, apparently from Mr. Rodwell's report the track was distorted. From the 27th sleeper the track was badly ripped up but after the 12th rail (which is just past bridge 731) it was not very much affected.

Mr. Rodwell, after his examination of the track, formed the opinion that the alignment of the curve (other than the portion affected by the accident) was good but not perfect. According to the gang chart the curve was through packed last April and the slacks picked up in July. On the day of the enquiry the track was again examined and it was noticed that the rail wear was considerable, the outer rail next to and beyond that on which there is the first mark of derailment having been turned and worn on its other face as well.

(*c*) *Markings on the outside of the chair of the outer rail.*—There were a few marks at mile 414/15, these then re-appeared at mile 414/17 and are continuous to the point where there is the first sign of a vehicle mounting the rail. Most of the chairs which are marked have two marks each about 3/8″ wide and about 1″ apart and it is to be noted that there are no marks on the inner rail chairs nor on the sleepers near the inner rail; the markings on the outer chairs were not therefore caused by a derailment. A gangman (other than the keyman) was asked to tap the keys and it was noticed that the mark he made when accidentally hitting the chair was different from those on the chair. It would appear then as if the marks were made by some fitting of the engine or its tender, or of a vehicle, hanging down and, as the marks occasionally appeared on consecutive chairs, whatever was hanging was not very loose, *e.g.*, it could not be a chain. The engine tender and vehicles were examined for any loose part but with no result. Some of the spring hangers of the vehicles were broken but the indication was that they were broken in consequence of the vehicles being derailed.

(*d*) *Speed of train.*—It would appear that if the point, where the leading bogie of the first vehicle left the track, is taken as the point where the coupling broke and where the vacuum brake must have been suddenly applied in full, (*i.e.*, if the brake was not partially applied by the driver before), then the engine travelled 340 feet before it came to rest and the train about 60 feet. Now the derailment of the vehicles behind the engine must have reduced the speed of the train from what it was before the

derailment occurred, and yet the engine travelled on for 340 feet with all brakes on and most of its wheels derailed. I come to the conclusion that the train must have been travelling definitely at high speed before the derailment took place. There is no reason why it should not have done so, as there is no speed restriction on the up track of this curve and the outer rail is superelevated for high speed. Another proof of the train having been travelling at high speed is the damage done to the trailing bogie of the leading vehicle for the frame was very badly doglegged as if it had struck something suddenly and violently possibly the masonry of bridge 731; when this happened the body of the vehicle was evidently still on the bogie as the bogie pin was badly bent.

(*c*) *Derailment of engine and vehicles.*—The first point to note is that the couplings between the vehicles did not give way; all that broke was the hook on the first vehicle to which the coupling of the tender was attached. By studying the marks left on the ground it would appear that:—

(i) the leading bogie of the first vehicle (3rd and Inter class No. 3579 which was capsized) did not leave the track till it was well past bridge No. 731 (2 × 6 ft. trough plates), whereas the trailing bogie of this vehicle left the track before it reached the culvert. It is evident then that this vehicle as it passed over bridge 731 had the leading bogie on the track and the trailing bogie off the track;

(ii) the second vehicle (3rd class No. 3711) which landed up in the same borrow pit as the first vehicle missed the borrow pit between telegraph posts 414/20 and 414/21;

(iii) the third vehicle (2nd class No. 3142) must have travelled partly in the borrow pit between telegraph posts 414/20 and 414/21: and apparently the leading bogie of the first vehicle left the track just after the leading bogie of this third vehicle struck the end of the borrow pit;

Now the first marks on the sleeper of the derailment of the engine or tender were just beyond the point where the leading bogie of the first vehicle left the track, I come to the conclusion then that, when the leading bogie of the third vehicle struck the end of the borrow pit, the coupling between the tender and the first vehicle (already under considerable strain) got a jerk and the hook broke. The sudden release in the strain between the tender and the first vehicle resulted in:—

(A) the engine shooting forward which occurred in spite of the fact that the vacuum pipe was also broken and the brake must have then been fully applied to the engine. This shooting forward together with the cross pull there must have been on the tender and engine accounts for the derailment of these units towards the down track or inside of the curve;

(B) the capsizing of the first vehicle—it is here of interest to note that the leading bogie of this vehicle travelled on clear and for a distance of about 45 ft. past the end of the vehicle, and the trailing bogie landed against the side of the vehicle after the body and underframe portion had capsized.

It is evident then that the first unit of the train to derail was one in rear of the first vehicle. This is confirmed by the fact that the track over and beyond bridge No. 731 was not very much affected. To decide as to which of the other vehicles was the first to derail is difficult, but it seems more than probable, that one of the wheels of a bogie vehicle, after it had got derailed, first travelled close to the rail smashing up the inner rail chairs, the four wheels of the derailed bogie then smashed up the sleepers thereby causing the derailment of the other vehicles, and it was the derailment of the other vehicles which carried the track away. If this supposition is actually what happened then the wheels of one of the bogies should show signs of having ground against the rails; this was definitely noticeable on the wheels of the trailing bogie of the second vehicle (No. 3711). There is also another interesting point I would mention namely that, for a distance of 27 sleepers from the first mounting mark, the wheel marks on the sleepers near the outer rail were quite shallow, indicating that the wheel which had rolled off the outer rail was more or less suspended. The question that now arises is, if the trailing bogie of the second vehicle was the first portion of the train to derail, then had any part of this bogie got detached when passing over the distorted track at mile 414/13? If so then this would account for the markings of the outer rail chairs [see para. (c)]. Apparently not for the bridle rods and the brake gear though distorted were intact, and no other parts of this particular bogie were missing.

(f) *Distortion of track at mile 414/13 to 14 and again 414/18 to 19 or beyond.*—There seems to be three possible reasons for the track having been distorted:—

Malicious tampering.—From the enquiries which I made and from the conclusions previously come to in the preliminary report already submitted we are all convinced that the track had not been tampered with. This conclusion has been based on the following criteria:—

the mark of the first derailment is that of a vehicle derailing towards the inside of the curve;

at the speed at which the train was travelling, the engine would have almost certainly come off the track at the point where the track had been tampered with, but in this accident the probability is that the engine was the last unit of the train to derail;

many of the keys which were picked up after the accident were crushed as if the rail had been pressing hard against them;

the track was out of alignment in two places. It seems inconceivable that any one who desired to wreck a train would tamper with the track at two separate places.

Defect in vehicle.—If a vehicle had disturbed the track in the way it was distorted at mile 414/12 to 14, it seems very improbable that the defect in the vehicle would have righted itself, for the track was undisturbed for a length of about 900 feet before the track was again distorted.

It would appear then that the track was distorted before the vehicles passed over the section of the line from 414/12 to 414/20.

By the engine.—Ruling out (a) and (b). the inference is that the track was distorted at both places as the result of the lurching of the

engine. This is confirmed by the evidence for the driver of 3 Up Mail in his statement states that after passing by the down warner signal (mile 414/14) he felt a lurch and applied the vacuum brake, when the engine steadied up he released the brake and opened the regulator but, on feeling the engine break away from the tram, he at once shut off steam and applied the vacuum brake (*Note*: he was cross questioned as to what he meant by saying that he applied the vacuum brake when the vacuum must have already been destroyed). A better description of the driver's experience is that which he gave to the Station Superintendent, Moghalsarai, immediately after the accident, namely, that when the driver felt a lurch, he shut off steam, applied the vacuum because he thought he had struck something and then, finding his engine had steadied, he opened up steam again and had not travelled very far before he felt further lurching, immediately after which the accident took place. This is practically the same description of the accident as that of the fireman of the engine.

(*g*) *Cause of engine distorting track.*—The engine of the train is one of the batch which has been built to the latest design for XB engines. So far it has had a good record but recently this engine along with other XB class engines, has been distorting the track (also 88½ lb. B. H. rails) on the Howrah-Burdwan Chord. The cause of XB class engines distorting the track is due to the way in which a lurching or hunting action is set up when this class of engine travels at about 55 miles per hour. This action has been and still is under investigation. An alteration has been made in the original design of the control springs of the engine bogie and also in the position of the radial truck; further, before an XB engine is put into service it has to undergo certain trials and the effect which the engine has on the track is recorded. Yet, in spite of all these precautions, the fact remains that this class of engine still is particularly severe on the track and readily discovers any weakness in the track.

At the end of para. (*b*) I have pointed out how the track was found to be not up to a high standard of efficiency, I attribute then the track having got distorted to the lurching action of the XB class engine which action may possibly have synchronised with the weak sections of the track on the curve.

4. *Finding.*—I am of the opinion that the train was travelling over the curve at high speed (probably not in excess of the sanctioned speed) and, as the maintenance of the track was not up to a sufficiently high standard to resist the lurching which the XB engine develops at high speed, the track got distorted from mile 414/12 to 14 and again 414/18 to 19 and possibly beyond. The engine tender and the first vehicle of the train passed over these distortions but one of the following vehicles (probably the trailing bogie of 3rd class bogie No. 3711 which was the second vehicle of the train) derailed in such a way as to result in the bogie taking up a position skew to the track and in consequence so damaged the track as to cause the derailment of the following vehicles.

I do not hold any one directly responsible for the accident, but, as the track laid with 88½ lb. B. H. rails is barely able to withstand the lurching of the engine, even if the track is maintained to a 100 per cent. standard of efficiency, there is therefore no factor of safety, and it is quite possible for other accidents to occur under similar circumstances. I therefore advise immediate attention on the recommendations which I am making in the next paragraph.

5. *Recommendations*:—

(*a*) *XB class engines.*—The possibility of reducing the lurching tendency of these engines to be further investigated and, in the meantime, it might be advisable not to put any more of this type of engine into service.

(*b*) *Speed restriction.*—I understand that the 90 lb. F. F. road is standing up to the XB engines, but it is the track with B. H. rails which gets distorted. This is to be expected for, besides the 90 lb. being a slightly heavier section, it has, in comparison with the 88½ lb. B. H. rails, about 2¼ times greater resistance to distortion. I consider that the speed of XB engines should be restricted to 50 miles per hour on track laid with B. H. rails of sections of 85 lb. and over (and, of course, further restricted on rails of lighter section) also that special observations be made of the way in which the 90 lb. track is able to stand up to the lurching of XB class engines so that the necessary information may be obtained as which type of track particularly in regard to the type of sleeper) is the most suitable to adopt in order to resist the disturbance set up by heavy locomotives now in use on fast trains.

(*c*) *Condemning section of rails.*—When I inspected the site of the accident and noticed the heavy rail wear on the curve I made enquiries as to whether any orders had been issued in regard to the condemning section of rails. I was informed that rails were changed when they looked as if they needed changing. This is unsatisfactory and I consider it essential for condemning sections to be fixed and templates of these sections issued to the permanent way staff.

Note.—The Senior Government Inspector subsequently agreed to the removal of the recommended speed restriction during the dry months of the year.

ROHILKUND AND KUMAON RAILWAY.

SIDE COLLISION BETWEEN 143-UP (B. & N. W. RAILWAY) PARCELS EXPRESS AND 50-DOWN (R. & K. RAILWAY) MIXED TRAIN AT AISHBAGH JUNCTION ON THE 10TH APRIL 1934.

FROM MR. A. I. SLEIGH, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 959/XIII/34, DATED 15TH MAY 1934, (C. No. 4995-T.).

On 14th April 1934, I held an enquiry at Aishbagh Junction to determine the cause of this accident and herewith submit my report and finding.

(i) *Description of the accident.*—At 1-47 on the morning of 10th April 1934, No. 143-Up (B. & N. W. Railway) parcels express was received at Aishbagh Junction on No. 2 line alongside the island platforms, the train came to rest so that the tender of the engine was in line with the water column: the destination of the train being Cawnpore.

The engine took water and the brakevan (at the end of the train) was uncoupled as two parcels vans, which were booked to Lucknow, and marshalled next to the brakevan, had to be shunted into the dead siding next to Line No. 1 a shunting movement that has to be done every day by this train. The train was then driven either by the driver or one of the engine crew, as I shall deal with later, apparently with the object of doing the necessary shunting work. On approaching points No. 3, (the up facing points for trains from Lucknow) the engine of this train side collided with the engine of 50-Down (R. & K. Railway) mixed train which left Lucknow Junction right time and for which the road was set and signals lowered for receiving the train on No. 3 line (alongside the other face of the island platform). The engine of 50 down was capsized and the engine of 143-Up and B. & N. W. Railway wagon (No. 7429) which was next to this engine, were derailed. According to the evidence the searchlights of both engines were full on at the time of the accident. The load of 143 up was 31=35½ units and the load of 50-Down consisted of one 6 wheeler brakevan four passenger bogies and a 4 wheeler brakevan.

The estimated cost of damage to the permanent way is Rs. 441 and Rs. 7,000 to the two engines.

(ii) *Description of the locality.*—The approach to Aishbagh Junction for up trains from Lucknow Junction is on a 800—955 ft. right hand compound curve. The outer signal is about 1920 ft. from the facing points and, on account of its being invisible from the station, the wire working the outer signal is also connected to an intermediate signal (a so-called repeater signal) which is approximately 700 ft. from the facing points. The home signal is 226 ft. from the facing points. It is understood that, on the date of the occurrence the lamps in the signals were burning properly and that the night, though dark, was clear.

The length of the straight from the end of the curve up to the facing points is about 350 ft. At the facing points the lines leading to No. 2 and No. 3 lines (on either side of the island platform, which is 100 ft. wide) bifurcate.

(iii) *Delay to traffic.*—Excluding the trains involved in the accident nine passenger trains suffered detention varying from 27 minutes to about 4 hours. Through running, by means of diversions, was resumed at 17-55 on 10th, but the line was blocked at 19-30 by the engine of 50 down falling over when it was being lifted. Through running was again restored at 23-45 on 10th (the day of the accident) over diversions at restricted speed.

(iv) *Summary of evidence.*—The main points which arise out of the enquiry are:—

(i) By whom was the engine of 143-Up goods being driven whilst the train was being shunted from the water column in the direction of the facing points (No. 3) close by which points the collision between the two engines took place;

(ii) who gave permission for this shunting operation to be done;

(iii) could the drivers of either (or both) of the trains have taken the necessary steps or precautions to avoid the accident.

Dealing with (i) the evidence is conflicting as one would expect. According to the engine crew the engine was being driven by Driver Sullivan, the guard's (143 up goods) evidence supports this evidence but it does not definitely corroborate it. The evidence of the station staff is definite in stating that the driver was not on the engine when the train was being shunted.

The answer to (ii) is also not clear as the guard and driver of 143 up both say that shunting signals were given but this is denied by the shunting staff. I shall refer to this point later on.

In regard to the possibility of the accident being avoided when the crew of the two engines saw that an accident was about to happen, I do not think more could have been done than was done. I however, am inclined to think that the accident might have been avoided or have been less serious if the vacuum brake had been connected throughout on 50 down.

2. *Finding.*—If Driver Sullivan's evidence that he was driving the train when the accident happened is accepted then he showed gross negligence by violating general rule 76 (*b*) in that he accepted signals (as he states were given) from the *rear* of the train when he was aware that 50 down mixed was about to arrive. His statement indicating that the shunting is *often* done before the arrival of 50 down is not correct for the reason that, from 1st February to 9th April (inclusive) 143 up has arrived seven minutes or more before 50 down on four occasions only. Nor is it correct to consider 50 down as being an unpunctual train: the number of late arrivals (10 minutes or more) at Aishbagh Junction for the same period being only four.

I however, do not accept Driver Sullivan's evidence that he was driving 143 up when it collided with 50 down mixed. I am of the opinion that he was not on the engine and that the shunting operation was being performed by one of the engine crews most probably by the fireman. I come

to this conclusion by the convincing way in which Bhagwati Prosad, Line Jemadar, gave his evidence and his statement that when he was going towards points No. 8 to stop the train, he noticed that there was only one man on the engine: this is corroborated by the fact that the Khalassi of the engine (Mohammed Raza) said that, when he heard there was going to be an accident, he jumped on the tender and lay down. Further I would point out that, on his own evidence, the purpose for which Driver Sullivan went to the station was satisfied close by the engine, thereby proving that the absolute necessity of his going to the station did not exist. Driver Sullivan therefore violated general rules 98 and 141, and, in so doing, was primarily responsible for the accident.

In view of the way in which the evidence was given and piecing together portions which read and rang true when given, it is not difficult to describe what most probably did happen. On the morning in question 143 up arrived at 1/47,—the earliest time since 1st February and only on six previous occasions had it arrived before its booked time (2-07 hours). The guard and the driver on arrival discussed the possibility of getting a bit earlier into Cawnpore, so the guard went to the station master's office to make an entry in the control book and the driver went to the control phone to get control to hurry his train through. The driver states, at the beginning of his evidence, that he told the fireman not to move his engine. What is more likely is he told him to shunt the train forward in order to do the shunt, for he knew from past experience of driving and shunting this particular train at Aishbagh that there was room for the shunt to be done without fouling the cross over which 50 down would run over. The fireman however, mis-judged his speed and was unable to stop the train before it collided with 50 down. I feel confident that the guard was aware that the fireman was going to drive the engine—anyway the indifference which he showed in not stopping his train from being shunted when he knew or ought to have known that 50 down was about to arrive, renders him culpable of contributory negligence by violating general rule 126.

3. *Recommendatoins.*—In the course of the enquiry I raised the question as to whether the station staff or the guard should have been, by rules, in charge of the shunting operation. I was informed that, as Aishbagh station was an important junction station and not a roadside station, the shunting should be carried out, in conformity with the railway company's working instructions No. 22 (2), under the control of the station staff. I consider working instructions 22 (2), (3) and (12) cannot be read to give this meaning; it appears to me that the instructions contained in rule 22 (3) should have been followed and the guard should have been in charge of the shunting. Anyway the administration should make these instructions clearer.

I have also not been able to find out from the administration whether or not 50 down should have had the vacuum brake connected throughout the train or not. Anyway this accident has pointed out the necessity that rules should be issued to the staff making it compulsory for trains to be vacuum braked whenever it is possible for this to be done.

BENGAL NAGPUR RAILWAY.

No. 370-UP GOODS RUNNING INTO A MOTOR LORRY (No. 4259) AT A LEVEL CROSSING NEAR BARA JAMDA STATION ON 25TH MAY 1934.

FROM MR. A. I. SLEIGH, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER No. 1275/XIII/34, DATED 18TH JUNE 1934, (C. No. 5002-T.).

I submit herewith my report on the enquiry which I held on the above accident at Bara-Jamda on 29th May 1934.

(i) *Brief description of the accident.*—At about 2-20 hours in the early morning of 25th May 1934, a motor lorry collided with the leading vehicle of 370 Up goods on a level crossing close by the catch siding points at the entrance to Bara Jamda station (Bengal Nagpur Railway). The motor lorry was employed in bringing manganese ore to Bara Jamda station. The train (370 Up goods) was being pushed from Bara Jamda in the direction of Barabil siding for the purpose of distributing empties to the loading sidings taking off Barabil siding. The load of the train was 18 bogie hopper trucks and 13 ordinarry 4-wheeler goods stock and a brake van. On the lorry were two male and two female coolies besides the motor lorry driver. One of the female coolies sat next to the driver—both she and the driver were killed instantaneously as the result of the accident. The other three coolies escaped with slight injuries. The train was brought to a stand-still with the leading vehicle about 115 ft. from the level crossing. Two of the front bogie wheels of the leading vehicle (bogie hopper truck No. 24626) were derailed and the motor lorry had evidently been pushed over by the bogie hopper truck for the wheels of the motor lorry were uppermost. The front portion of the lorry was not seriously damaged as the lorry was struck on the portion of the body in rear of the dash board. The motor lorry wreckage was wedged in between the front wheels and the buffer of the leading vehicle.

(ii) *Description of the locality*—The level crossing is an unmanned level crossing, the road being mostly used by vehicles bringing minerals to Bara Jamda for despatch. The road is not metalled. The crossing is classified as C class and is suitably provided with check rails. From the station towards the level crossing the alignment of the railway is on a $3\frac{1}{2}^{\circ}$ curve. On account of the existence of steep down gradients in the direction Barabil to Bara Jamda all trains going to the Barabil sidings are pushed. For this reason and the fact that the curve is left handed, it is not possible for the driver of a train to see a motor lorry coming towards the level crossing from the direction in which this particular motor lorry was travelling. The view of a road user, coming along the road from the mines to the station, of a train approaching the level crossing is only possible from a point about 70 ft. from the level crossing and is not too good, but could be made better if jungle and spoil from a cutting on the Gua line were removed.

At the time of the occurrence the moon was apparently either setting or had just set. The evidence as to whether the lights on the car were burning properly or not varies. Anyway it is clear that the motor driver was well acquainted with the road for it is understood that not only had he been in service with other firms in the neighbourhood but had, on the day of the accident, actually completed four trips to the station with mineral ore and was doing his fifth trip when the accident happened.

(iii) *Summary of the evidence.*—A large portion of the evidence deals with the question as to whether the guards of 370 Up and 373 Down had had any conversation with any of the survivors of the accident and whether in that conversation, the survivors had stated that they had warned the motor lorry driver that a train was approaching the level crossing. The survivors all state that they did not have any conversation with any of the railway staff but the guards stated that they did and each in turn picked out the same survivor Budhoo. At the enquiry Budhoo gave his evidence in a vernacular spoken by the inhabitants of the Kolhan territory (in which Bara Jamda lies) as he stated he did not know Hindi. He however, was able to understand some remarks which guard Rao put to him in Hindi and the Inspector of Police stated to the Magistrate at the enquiry that Budhoo did understand Hindi. Further, when he was identified by guards Rao and Ghose, Budhoo appeared to be feeling very uncomfortable. I am confident that the guards did have a conversation with Budhoo. As to what the conversation was and whether Budhoo actually did tell the guards that he had warned the motor driver of the approach of a train, I am not convinced, as the guard's evidence is a little conflicting as to where they first met Budhoo. However, the duty of being on the look out for trains approaching the level crossing was not Budhoo's, it was the motor driver's.

(iv) *Safety first precautions.*—The question that arises is whether this level crossing should be provided with gates and manned day and night in view of the fact that there is a certain amount of motor traffic over the level crossing. Of the 26 and 24 motor vehicles that passed over the level crossing on 1st and 2nd June. 24 and 22 of these vehicles respectively were connected with the transport of mineral ore. As the drivers of these vehicles are fully acquainted with the local conditions, it is unnecessary to provide gates and gate-keepers to regulate the road traffic.

As regards warning notices informing road users unacquainted with the road of the existence of a level crossing under item 18 of Chapter XI of the rules for the opening of a railway it is laid down that, in the case of C class level crossings where neither gates nor chains have been provided, it is only necessary to provide posts painted white at the level crossing. These had been provided by the administration. In the rules recently issued for working Barabil siding it is laid down that trains going to Barabil siding must be pushed and have a traffic jemadar on the leading vehicle. Since the train came to a stop with the leading vehicle only 115 ft. (about) from the level crossing, it would seem that the traffic jemadar was travelling on the leading vehicle and it was he who first gave a danger signal as he saw that an accident was going to take place.

(v) *Finding.*—I come to the definite conclusion then that the accident was due solely to the carelessness of the motor lorry driver in not observing the necessary precaution of slowing down and satisfying himself that there was no train approaching the level crossing before he attempted to go over the level crossing.

BENGAL NAGPUR RAILWAY.

DERAILMENT OF UP LIGHT TRAIN AT MILE 641/11, BETWEEN BALAGHAT AND HATTA ROAD AT 18-45 HRS. ON 15TH JUNE 1934.

FROM MR. A. I. SLEIGH, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1511/XIII/34, DATED 21ST JULY 1934, (C. No. 5031-T.).

I forward herewith for the information of the Railway Board a copy of the proceedings of the joint enquiry held on 19th June 1934.

2. I agree with the finding of the committee that the vehicles of the train were capsized by a violent wind storm.

Proceedings of the Joint Enquiry held on the 19th June 1934.

1. *Description of accident.*—At 18-45 hrs. on 15th June 1934, while the Up Light train was proceeding from Hatta Road to Balaghat, the complete train consisting of five bogies, with the exception of the engine capsized at mile 641/10-11.

The load of the train was 5 vehicles or 55 tons; it was worked by Engine No. 0089 BS, Driver S. John and Guard Sagir Mohomed.

2. *Description of the locality of the accident.*—The site of the accident which is about 1⅔ miles after leaving Hatta Road station is on a low embankment which varies in height from one to two feet. A 12 feet girder bridge No. 22 is situated at a distance of 185 feet from where the Brake Van capsized. The line from the site of the accident towards Balaghat is straight for several miles. On the Hatta Road side there is a 1° curve about 900 feet long commencing at mile 640/21, and ending at mile 641/2. There is a falling grade of 1 in 500 from mile 641/7 to mile 641/9; the track at the site of the accident from mile 641/9-11 is level and a rising gradient from mile 641/11, up to about mile 641/18. The view of both sides of the site of the accident is clear, the country being quite open.

3. *Summary of evidence.*—The Up Light train from Gondia left Hatta Road station on 15th June 1934 at 18-23 hrs. From the evidence it appears that at the time there was a light drizzle and ordinary wind. About a mile from Hatta Road the wind became very strong and it continued to rain accompanied with hail. After going a little further the storm suddenly became very violent and the Driver immediately stopped the train to guard against any accident taking place. At about 18-45 hrs. within about 2 minutes from the time the train came to a halt, the complete train with the exception of the engine capsized due to a violent wind storm.

As soon as the Engine crew heard the noise of the vehicles capsizing they went to the Brake Van where they found the Guard and P. W. Inspector, Balaghat injured and trapped. They were taken out from the Brake Van and the engine staff then helped out the passengers who were

also unable to get out of the upturned vehicles. The cuts and bruises of some of the injured passengers were attended to and bandaged up and with 3 women passengers, two children and P. W. Inspector, Balaghat, who were somewhat more injured than the others, were taken on the engine which left for Balaghat with a memo. from the Guard to the Station Master Balaghat advising him of the accident. The engine arrived at Balaghat at about 20-15 hrs.

On arrival of the engine of the Up Light train with P. W. Inspector, Balaghat, three injured women passengers and two injured children, they were immediately given first aid by the Guard of 147 Down which was standing at Balaghat and the Civil Assistant Surgeon of Waraseoni. One of the women passengers was sent to the Civil Hospital on a stretcher and other passengers were sent on a tonga with a G. R. Police constable with a memo. to the Civil Surgeon, Balaghat, to send medical assistance to the injured passengers at the site of the accident. The G. R. P. Constable was also asked to inform the Civil Police of the accident.

At 21-30 hours a Relief train was made up with the engine of 143 Down and sent on Block ticket to the site of the accident with medical assistance. The Relief train returned at about 23-15 hours and brought the remaining passengers of the capsized train.

Altogether fourteen passengers were injured. The injuries to all the passengers were very slight and they were attended to by the Civil Medical authorities and discharged immediately with the exception of a woman named Shambati, wife of Tulsiram Bania, who was kept under observation till the next morning when she was discharged quite fit. Of the Railway servants, P. W. Inspector, Balaghat, was somewhat severely injured.

Up Relief train arrived at the site of the accident from Gondia at 1-15 hours. No. 143 Down left Balaghat with the passengers of No. 147 Down also on Block ticket at 0-30 hours for transhipment with the passengers of 138 Up which arrived at the site of the accident at 3-9 hours and she returned to Balaghat at 5-15 hours after the transhipment. No. 138 Up returned as No. 143 Down at 4-45 hours.

Down Relief train with the District Engineer, Assistant Loco. and Carriage Superintendent, Assistant Engineer, myself and necessary staff with crane and medical assistance from Nainpur arrived at Balaghat at 2-35 hours; and on return of No. 143 Down as No. 138 Up on Block ticket the Relief train started for mile 641/11 on Block ticket. After slewing of the track clear of the capsized vehicles and necessary repairs and examination of the track, the block was removed at 7-30 hours.

DIBRU SADIYA RAILWAY.

NO. 27 UP GOODS TRAIN RUNNING INTO A MOTOR LORRY OF DEHING TEA ESTATE, ON THE 16TH AUGUST 1934.

FROM RAI BAHADUR D. N. BATRA, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 1287/401/XIII/34, DATED 19TH OCTOBER 1934. (CASE NO. 6076-T.).

I beg to report for the information of the Railway Board that a serious collision occurred at a 'C' Class unmanned Level Crossing on the above Railway on 16th August 1934, between 27-Up Goods train and a motor lorry with a trailer belonging to Dehing Tea Estate, resulting in the death of 3 persons including the driver of the lorry and serious injury to another tea garden cooly. A Railway District Officers' Joint Enquiry was held on 20th August 1934,

2. *Description of the locality.*—The collision took place at mile 59/1-2 between Margherita and Powai stations at 10-5 hours. The weather was bright and clear. At this place the track is straight and on a level and the railway line passes through a tea garden. The view of the Railway line from tea garden road is clear and unobstructed after passing the Tea Manager's office which is situated at a distance of 166 ft. from the Railway line.

3. The 27 Up Goods train drawn by a Tank Engine No. 41 was travelling at a speed of 20 miles an hour from Powai station under "Line Clear" towards Margherita Station. It appears that as it approached this level crossing, the fireman was firing coal in the engine and the driver being on the right side did not notice the lorry and trailer approaching till it was too late. The Lorry and trailer started from the Tea Garden Manager's office after getting instructions from Mr. Hastings, the Manager and took the level crossing without its driver taking the precaution of looking on either side to see if anything on the Railway line was approaching. The Lorry and the trailer was running empty and had 3 coolies besides the driver. After collision, the lorry and trailer were dragged a distance of 1,800 ft. from the point of collision before the train could be stopped. The train was fairly long consisting of a load of 43 four-wheelers and 3 bogies and it was running non-vacuumed. Out of the 4 men on the lorry, the driver and the two men were killed and the fourth one was seriously injured. He was given "First Aid" and sent to the tea-garden hospital for treatment, where he was under treatment and has since been discharged from hospital on the 9th September.

The engine is fitted with steam and hand brakes. There was no damage to the engine except that the cow-catcher was slightly damaged as a result of this accident. The Level Crossing is an unmanned 'C' Class Level Crossing with no gates and hence the responsibility of seeing that it was clear before entering it rests mainly with the road traffic. The usual Four White Posts are there to warn the public that they are approaching a Railway Level Crossing.

Conclusion.—It appears from the evidence that the driver of the tea garden lorry on starting from the tea garden office did not hear the train approaching and did not take the trouble of looking on either side towards the Railway line, the view of which was unobstructed, before coming to the Railway Level Crossing. Although he was a certified driver of 6 years service it appears that he was talking to the coolies sitting besides him. I consider that the driver of the lorry is mainly responsible for this accident.

Recommendation.—I would recommend that at all Level Crossings on this Railway which are used by the Motor Traffic, proper road signs should be erected in addition to Four White Posts as an additional warning.

BENGAL NAGPUR RAILWAY.

DERAILMENT OF NO. 46 UP PASSENGER AT MILE 137/10-11 BETWEEN KESINGA AND RUPRA ROAD STATIONS ON THE RAIPUR-VIZIANAGRAM SECTION ON 20TH SEPTEMBER 1934.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, TO THE SECRETARY, RAILWAY BOARD, LETTER NO. 2075/XIII/34, DATED 15TH OCTOBER 1934 (C. No. 6077-T).

I submit herewith my report on the enquiry held by me at Titlagarh on 23rd September 1934 into the above mentioned accident.

2. First news of the accident was received by me by telephone at about 10-30 A.M. on 21st September 1934. This was very indefinite and merely described the matter as serious. I proceeded by mail the same day to Raipur and thence by special train to the site of the accident, learning *'en route'* that several persons had been killed.

3. At Kesinga at about 14-30 hours of 22nd September, I first investigated, in the station master's office, details concerning the despatch of the train. Eventually I arrived on the scene of the accident at about 15-00 hours 22nd September.

4. I then learnt that 9 people had been killed and a number more or less injured. At least one person being missing. I found that the train had crashed into a breach in the bank, three coaches being entirely wrecked and a fourth partially telescoped. The engine being derailed and capsized. I decided to hold an enquiry the following day and in the meantime to study the locality.

5. The enquiry was held at Titlagarh at 13-30 hours on 23rd September 1934.

The following Officers were present:—

1. Mr. V. Satyanaranya, Taluk Magistrate of Bissum, Cuttack.
2. Mr. Sinyavasa Iyengar, Inspector of Railway Police, Waltair.
3. Mr. A. T. D. Anderson, Superintendent, Maintenance, B. N. Railway.
4. Mr. K. W. R. O'Reilly, District Transportation Officer, Waltair.
5. Mr. J. C. G. Baillie, District Locomotive Superintendent, Khurda Road.
6. Mr. V. de la Nougerede, District Engineer, Titlagarh.

Description of Accident.

6. Train No. 46 UP left Kesinga station at 23-51 hours, five minutes late, on 20th September 1934. The train consisted of Engine No. 123, six-wheeled F class, six bogie coaches and one upper subordinate coach, the marshalling in order from the engine being—one bogie third class and luggage van, one Inter class bogie, two third class bogies, an upper class bogie, a third class and luggage van, and the subordinate coach in rear.

At a minute or two after midnight the train reached mile 137, 10-11, a point just under three and a half miles distant from Kesinga, and crashed through the track, the bank being washed away for a short length leaving the rails and sleepers unsupported. The engine and tender ran the gap as the rails parted and mounted the opposite side before capsizing. The leading coach nose-dived into the breach, the coupling parting, the second coach followed the first and the third followed the second, the frames of the second and third coaches each getting under that of the coach in front of it. The fourth coach had already crashed into the third and started to telescope when it pulled up. Whatever may have been the width of breach at the moment of the crash it finished at 68′ wide. The height of formation is 3′ to 4′ only at this spot. The water level was evidently still high and the occupants of these coaches had no chance. Nine bodies had been recovered on 21st September and two more were recovered from about 400 yards distance shortly after my arrival on 22nd September. Nine people were injured, of these one died in hospital. On 25th September another body was found thus making a total of 13 deaths. The driver and fireman were among those injured comparatively slightly, but were very badly shaken. The damage to the engine seemed slight, its searchlight was intact. The engine Khalassi, who had gone into the train at Kesinga, was among those killed.

The injured were early and satisfactorily attended to by the Assistant Surgeon who arrived from Titlagarh at 8 A.M. on 21st September. The dead were disposed of by the police.

7. The undamaged coaches of the train, the 5th and 6th, were returned as 45 Down, they were intact in every respect. Relief trains arrived on 21st September from (*a*) Kantabanji 8 hours (*b*) Rayaghada 13 hours (*c*) Waltair 21 hours (*d*) Bilaspur 23 hours, the last two only having powerful cranes. Transhipment was effected on 21st and 22nd September and through running was restored at 15 hours on 23rd September. This was effected by filling the gap and creating a slight diversion around the capsized engine.

Description of locality of the accident.

8. The site of the accident is at the bottom of a dip between two grades, a 1 in 500 from Kesinga, a short level of 450′ followed by a 1 in 270 rise towards Rupra Road. The track is on the straight. The actual point of breach is opposite T. P. 137/11 about 500′ up the steeper grade and just beyond a low cutting through the foot of a small hill. The bank is 3·7′ in height and is a short length connecting the foot of the hill with an outcrop of stone about 100′ away. The nearest gang huts are at miles 135/16 and 139/4, the position of the breach is therefore

exactly midway between the two. This section is not subject to floods nor has any accumulation of water ever been known here before. The nature and general lie of the country shew no tendency to flood or danger from natural causes. It is not a section under special patrol during the monsoon. The approach from the Kesinga side is straight for very nearly 1,000′ but owing to the hill on the east side, the cutting and the trees, it is not possible to see the open country beyond.

Conclusions.

9. *Cause of the breach.*—This is undoubtedly due to a very large quantity of water having accumulated on the east side of the bank and having attained sufficient height to top the ballast and rails at this dip in the track. I have found clear proof of this from ballast, obviously washed out from the track, lying well away from the foot of the bank, up to a point 100′—200′ beyond the breach. The marks on trees and bushes, the position of debris on the east of the line, all indicate a high water level of 648·5, or more whereas formation level is only 646·70 at the breach. It is clear that at the highest flood, before the bank breached, water must have been flowing through the cutting. This verifies the driver's statement that he saw water beside the ballast. It must have been on the ebb and indicates that the actual breach occurred only a very short while before the arrival of the train.

10. The reason for such a sudden and unusual flood of water at this site was not immediately apparent and I proceeded up the grade past the breach to investigate. At mile 137/16-17 is a small $2 \times 3' \times 3\frac{3}{4}'$ opening which had obviously been submerged. At mile 137/21 is the Sirrul nullah a $1 \times 20'$ span. Formation level here is nearly 9′ higher than at the breach site and the position of debris and other signs shewed that water level had been up to 6′ from top of the bank, though at the moment, less than 48 hours from the disaster, the nullah was running almost dry. There must therefore have been a very heavy and sudden torrent through this opening. Looking upstream there appeared to be a ridge or dam across the hill slopes about 1,000′ away and a number of villagers carrying loads, apparently doing bank repairs. It being late evening investigation was not possible but a man was sent through the jungle who returned reporting that the villagers were repairing a breach in their bund.

11. On 23rd September 1934 I proceeded, in company with the Superintendent of Maintenance, Bengal Nagpur Railway, and other Officers, up the country side to this dam opposite T. P. 137 20. The paddy fields on the slopes are lightly terraced, the crops were all flood-swept, their inclination and that of grass, etc., being in the direction from the bund to the railway breach. On arrival at the top of the bund, which is 700′ from the railway line, the trouble was apparent. A large lake had been formed for water storage by the construction of a dam across two hill slopes, this area, now surveyed, is approximately 950′ long by 500′ wide. At the corner directly facing the railway breach at "A" in the plan the dam had been very newly repaired for a length of about $40' \times 4'$ in height, this was the point at which I had witnessed the earthwork repairs the previous evening from the railway bank.

At the other end of the dam at point B is the natural outlet from this lake, over a rocky fall, into the Sirrul nullah. Along the top of

this rock were the remains of another dam, this apparently of a temporary nature. It would appear that the villagers had raised the water level in the tank by raising the outlet level. This was evidently the situation on 20th September 1934 before the heavy rainfall that night.

12. On night of 20th September 1934 there was very heavy rainfall. There is no rain gauge in the vicinity the nearest being at Titlagarh, 11 miles away. The recorded falls at this station are, for 24 hours ending 10 A.M.

on 19-9-34	Nil	
20-9-34	·66	
21-9-34	6·51	◁——— — — ——— accident
22-9-34	·05	

The greater portion of the heavy rain which fell on 20th/21st being between sunset and midnight of September 20th.

13. It is clear what happened. The heavy rain raised the water level in this lake or tank, as it is called, to beyond its capacity. The dam burst at the two points A and B and precipitated a vast volume of water towards the railway line. It is not known which point was the first to burst but it was probably at A. The torrent poured down the slope, collecting further supplies from the paddy fields, towards mile 137/11. It could not have taken very long to fill the low area, shewn in red on the plan, and to a depth of 4′ or 5′ opposite the lowest point of the line which it topped and breached. The soil in the bank appears to be a red gravelly earth, rather friable, and easily eroded. High flood levels so far as they can be gauged, shew at least a level of 648·50 whereas the formation level at the breach is 646·70. A moderate calculation shews that the whole event could have taken place within a period of from ½ hour to 1 hour duration. In 12 hours the site of the breach was practically dry again. It is reported that the flooding of the tank was further aggravated by the bursting of another larger tank a few miles higher up the valley (Pathardanga tank). The high water level marks in the local tank, as shown by debris, is 658·3 and its level after breaching is 654·5, a difference of 3·8′. The area of the tank is approximately 950′ × 500′ = 4,75,000 s. ft. Volume discharged therefore = 18,05,000 cft. Through an opening 40′ wide the first 10,00,000 cft. of this would be discharged in 30 minutes exactly. In 3/4 hour the volume, augmented by rain, paddy fields, etc., would be far greater than this, held up in the hollow at Ch. 137/11. Distance from tank to breach is 2,200′ which would be covered very quickly. The flooded area above the breach is 1,600′ × 300′ and its average level below 646·7 (formation at breach) is about 2′ or less. An attack by 10,00,000 cft. of water would therefore top the bank at mile 137/11. There was no sustained attack by flow from the tank. Once it had burst it precipitated its whole surplus in less than an hour against the railway bank. Having forced the breach it was released in a few hours in spite of the obstructions by debris. The rocky ends of the breach prevented any further enlargement and the fall in level prevented breach elsewhere though ballast was washed out at 137 12/13.

From the above it is clear that the longest time that can be allowed from the bursting of the tank to the breaching of the bank is 1½ hours, it was probably less. The driver saw water beside the ballast. The guard

and Mr. Mitchell state that water was very high. The flood had therefore obtained release through the bank only a very short while before the train reached the spot at midnight. The level had probably dropped a foot. By calculation this would have taken 10 minutes to 15 minutes.

I therefore conclude that the tank burst not earlier than 22·30 hours and that the railway bank breached between 23·30 hours and 23·45 hours on 20th September 1934.

14. *Inspection of the line.*—The Sub-Permanent Way Inspector had trollied the section at 15 hours in the afternoon. The District Engineer passed in the train 105 Down at about 18-45 hours in the evening. Everything was then normal. Although this is not a flood section and subject to regular patrol, I was subsequently informed that the Bengal Nagpur Railway rule is that at heavy rain the gang khalassis must inspect the track and that on the night in question this had been observed. Khalassis from the gang huts at miles 135/16 and 139/4 had gone out at 20 hours and 19-30 hours respectively, walking to mile 137/12 and returning before midnight. They had therefore been at the site of the flood at about 22 hours. The tank had not then burst.

15. *Speed of the train.*—46 Up left Kesinga at 23-51. The driver states that he looked at his watch immediately after the accident and saw it 4 minutes past midnight. Mr. Mitchell the Chief Inspector of Accounts states that he went to bed at midnight and had not gone to sleep. The train had therefore travelled 3½ miles in from 9 to 13 minutes. Being 5 minutes late only, with several hours run still ahead, there was no object in making up time. The fireman states that speed was 20 miles per hour and the driver states 22 miles per hour to 23 miles per hour. The train had just run down a grade. Permissible speed is 30 miles per hour. From the above it appears *prima facie* that the actual speed was probably somewhere between 25 miles per hour and 30 miles per hour but not more.

16. The train was fully vacuumed and was brought to rest by its own brakes. These applied themselves the moment the train pipe parted behind the engine. The driver had no time to apply them. There was no impact imparted from coach to coach through the buffers and frames. The frame of each of the leading wrecked coaches passed through the fragile bodies of the one behind with little resistance.

The total train load consisting of 6 bogie coaches and 1 four wheeler =255/7 tons.

All wheels braked=52 blocks, the number and weight reducing as each leading vehicle went out of action.

From Diagram 1 it is seen that the undamaged vehicles travelled a distance 157′ only before coming to a stop, *i.e.*, less than 53 yards.

The following results have been obtained from vacuum automatic brake tests:—

On the level and dry.

Twelve 6 wheeled coaches braked on 4-wheels each coach weight 240 tons, 48 brake blocks.

30 m. p. h. stop in 100 yards in 11½ seconds.

40 m. p. h. stop in 175 yards in 16 seconds.

On the occasion of the accident the grade was against the level but the rails were thoroughly wet and slippery.

I therefore conclude that the speed of the train must have been less than 30 m. p. h. and that the vacuum brake was acting satisfactorily. The undamaged vehicles had been removed before my arrival, examined, found in good order and continued in service.

17. *Local conditions at time of accident.*—There is really very little information to be obtained from the evidence of passengers. They were all, probably, asleep. They cannot even say which coach they were travelling in. From the evidence of the engine crew, Mr. Mitchell and the guard it was a dark night, windy and raining. The engine headlight was burning, the bulb was tested by me and found still intact after the accident. The driver states that he could see one telegraph post ahead, *i.e.*, 220 feet, without any difficulty. The approach to the cutting just beyond which the breach occurred is shaded with trees, the rock in the cutting is of a light grey colour which would show up very white at night in the engine head lights. The view beyond the cutting is entirely masked by the hillside on the left and the cutting itself. The driver's view was therefore confined to the track only and to the rails principally. These were undoubtedly intact and no sag was discernible. I am satisfied that he was keeping a look out as he says and was in no way to blame.

Finding.

18. *The accident was due* to the train running into a *breach* at mile 137/10-11. The breach had occurred at such a time and with such rapidity as to render its chances of early detection or the prevention of the accident extremely minute. The situation of the breach prevented its being seen by the driver of the engine.

The breach was due to an artificial tank or storage lake immediately above and close to the railway line becoming so overfull as to burst its banks and to precipitate a vast volume of water immediately on to the railway embankment at a spot not designed and not strong enough to withstand it. I am not prepared to say to what extent this is due to the villagers having attempted to raise the level of their tank by obstructing the natural outlet into the nullah nor how much is due to the heavy rainfall and bursting of a similar tank several miles higher up the valley.

Recommendations.

(*a*) An opening should be provided at the breach site to meet any such similar eventuality in future. The opening should be not less than 10′ span.

(*b*) The tank or lake created by the bund across the valley opposite mile 137/20 should immediately be declared to be a 'railway-affecting' tank. It should be regularly inspected and controlled and a limit fixed as to the height to which water may be impounded.

GIPD—L345RB—22-2-35—440.

20 NOV. 1935

PRB—RA/17.

Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 31st March 1935

No. 17

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1. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Derailment of No. 29 Up Passenger train between Rao and Indore stations on the Chitorgarh—Khandwa section, Metre Gauge, on the 8th October 1934.

LETTER FROM RAI BAHADUR P. L. DHAWAN, M.A., M.I.E. (IND.), SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, No. 1487, DATED THE 24TH OCTOBER 1934. (6049-T.)

Description of Accident.

On 8th October 1934, at about 1|50 hours the engine and tender of 29 Up Fast Passenger was badly derailed. Also BT 1523 and BTLG 2468 next to engine derailed and capsized, while BT 1391 completely derailed and BT 1253 front bogie wheels derailed. It was a miracle that there were no serious casualties. At the time only two passengers appeared to be injured one possibly seriously and one slightly but subsequently the Assistant Medical Officer, Mhow, found and attended six other passengers very slightly injured and the engine Khalasi who was also very slightly injured.

2. An Officers' Joint Enquiry was held at Mhow on the 12th October and a further enquiry was held at the same place by me on the 19th October when the District Magistrate, Mhow, and Deputy Superintendent of Police, Indore, were present. Some of the witnesses that appeared before the Joint Enquiry were recalled and questioned by me.

3. Mr. Clarke, District Traffic Superintendent, Mhow, who was travelling by 30 Down at Rao, got the news at 2|20 and arrived at the scene of the accident soon after with the engine of 30 Down, was examined by me. The following important quotations from his evidence are given :—

> " The engine head light showed up the accident splendidly, the whole thing looked pretty grim. The engine was completely derailed on the west side of the line and was leaning over at quite an unpleasant angle. The tender was even worse being canted over at a dangerous angle. Then came the leading bogie third No. 1523. This had completely capsized and thrown well out from the line and it was slightly telescoped by the tender and driven through the leading compartment of BTLG 2468 attached next to it. .... To my delight and surprise only two of them were injured one possibly rather badly and one only slightly. .... An excellent little Bombardier from " H " Battery had been most helpful in getting the passengers out of the derailed and capsized vehicles in addition to having bandaged the two injured passengers.... He also showed me what he and the driver thought was the cause of the derailment and one glance convinced me that they were correct. At the point of the derailment lay on the foot-path on the west of the line, one absolutely intact rail, bolts and fish-plates missing. In the dark I was unable to find the missing bolts and fish-plate but directly it was light, we found the plates lying in pairs at the bottom of the bank, exactly opposite the rail that had been removed and bolts had been hidden under some loose grass between the track. Subsequently sections of a kerosine tin rail were discovered which turned out to be a complete dummy rail. Each section was numbered and so made that the sections fitted into each other the two end sections having long bits of string attached to them so that they could be attached to the rails and packed with lots of grass, etc., to bring it up to the height of the other rails, so as to mislead the driver even if his attention might be called to it by the engine headlights."

4. I inspected the site of the accident on the 19th and also inspected the damaged rails removed from the track and brought into Mhow. One end of one of these rails which was next to the one removed, had a battered head where the derailed wheels of the engine or bogies had hit it.

Conclusion.

5. From the evidence laid I have not the least doubt in my mind that the derailment was due to the removal of a rail by some unknown persons.

6. The approximate cost of damages to the permanent way, rolling stock and engine is Rs. 215, Rs. 23,900 and Rs. 200 respectively.

L149RB

2. GREAT INDIAN PENINSULA RAILWAY.

Collision between a goods train and a rake of tramway wagons on the Kymore Siding on the 10th October 1934.

LETTER FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, No. 1914, DATED THE 21ST DECEMBER 1934. (6054-T.)

I have to report that in accordance with paragraph 7 (4) of Railway Department's Notification No. 1926-T., dated 19th March 1930, I held an enquiry on 18th December 1934 into the circumstances attending a collision that occurred between a goods train and a rake of tramway wagons on the Kymore Siding of the G. I. P. Railway on 10th October 1934.

2. The enquiry was held at Jukehi on 18th December 1934 and continued at Jubbulpore on 19th December.

The Police Department and the Magistracy were not represented at the accident though advised and I can only presume because of the prosecution undertaken against the G. I. P. Railway driver, guard and pointsman, which case is subjudice.

Brief Description of the Accident.

3. A goods train rake of 48 wagons, 2 brake-vans and 2 spare engine tanks was being pushed out from Jukehi Station on the Jubbulpore-Allahabad Section of the G. I. P. Railway into the Kymore Siding, 13½ miles long, serving the Central Provinces and other Lime and Cement Works.

4. This goods rake was being pushed with engine tender foremost and with the brake-van leading. There was a Pilot Guard in the leading brake-van who, under the circumstances, controlled the train which was fully vacuum braked, it is said with 10|12 in. of vacuum but I consider it more likely that there was a slightly lower pressure.

5. At about mile 2¼ of the Kymore Siding, the G. I. P. Broad Gauge track is crossed by a steam tramway 2 ft. Gauge by means of a diamond crossing. At this crossing the brake-van of the Broad Gauge train struck the middle of a rake of tramway stock consisting of an engine and 12 empty tip wagons. The brake-van carried away 7 of the empty wagons, pushed them for about 200 feet beyond the crossing when the brake-van, 9 Broad Gauge wagons and the tip wagons were derailed and piled up in a tangled mass. At the same time the rear brake-van next to the engine was also derailed.

6. The guard of the leading brake-van was injured slightly and was extremely fortunate to escape with his life. Two or three other G. I. P. Railway staff and unauthorised passengers are said to have suffered slight abrasions but details are not reported.

7. The damage to Rolling Stock was serious and is estimated as under :—

	Rs.
Broad Gauge Stock	13,000
Tramway Stock	1,000
Permanent Way	1,300
Total ..	15,300

Description of the Site of Accident, Weather Conditions, etc.

8. The site of the accident was the diamond crossing on the Kymore Cement Works Siding at mile 2¼ from Jukehi Station on the G. I. P. Railway. At this point the G. I. P. Railway Broad Gauge and the Tata Tramway 2 ft. Gauge cross each other after running in view and parallel to each other and about 100 yards apart for about 1½ miles.

The Broad Gauge approaches the crossing from Jukehi on a rising gradient of 1|300 for 2000 feet after a fall of 1|300 and 1|500 for a mile. The Narrow Gauge is a slight hump over the crossing after a level. The Broad Gauge and Tramway approach each other on the straight. The Broad Gauge signal is visible for 1200 feet before it is reached.

9. The accident occurred at 10.30 hours in bright sunlight and fine weather and visibility was at its best.

10. The Broad Gauge siding was built in 1921 under the administration of the East Indian Railway and when the Tramway was already in existence. The diamond crossing of the two lines is protected on the Broad Gauge by 2 signals (one for each direction) each about 660 feet from the crossing. The Tramway was guarded by 2 scotch blocks 63 ft.-6 in. and 66 ft. from the centre of the crossing. One signal lever placed opposite the hill or north side scotch block operated both the signals and the scotch blocks. A device was provided which ensured that, if either Broad Gauge signal is lowered, both scotch blocks came into operation and closed the tramway line to the approach of any train on that line.

11. It can be seen therefore that with lever, signals and scotch blocks in good working order, an accident is only possible if the Broad Gauge train runs against signals. Under the East Indian Railway Administration and until 1929 under the G. I. P. Railway a further precaution was taken, and by the special rules enforced for working trains over the siding the Broad Gauge signal was kept at danger till the train had been brought to a stand at it, when, and only if the line was clear, this signal was lowered and the train was allowed to proceed over the diamond crossing. Since 1929 this rule has been deleted from the special working rules.

Special Rules for Working the Kymore Siding.

12. In 1929 the G. I. P. Railway Administration issued and introduced special rules for working Jukehi Station and in paragraph VIII of these rules gave the conditions under which the Station Master, Jukehi, was empowered to work trains in and out of the Kymore siding.

13. I consider these Rules wholly inadequate and consider that revised special rules and a correct diagram should be issued immediately after being submitted to me for approval.

The Evidence.

14. The evidence of the G. I. P. Railway Staff had been taken very fully and recorded at the Senior Officers' Enquiry held on 16th-18th October 1934. At my enquiry only short supplementary evidence was taken from these witnesses, but the evidence of non-Railway witnesses brought to my enquiry by Mr. Nusserwanji, Proprietor of Lime Works and Lessee of Tramway, Jukehi, is recorded in full.

15. The evidence centres round 3 questions :—

(*i*) The position of the Broad Gauge signal, whether or not it was lowered for the train to proceed over the Diamond Crossing.

(*ii*) The condition of the Scotch Blocks on the Tramway Line which should work with the Broad Gauge Signals from the one lever. If the Scotch Blocks had been in good working order they would stop or derail the Tramway train if the Signal was lowered for the Broad Gauge and conversely if they permitted the Tramway train to get on to the Diamond Crossing, as was the case, then the Broad Gauge signal must have been at danger and the G. I. P. Railway train staff would have been wholly responsible for the collision. As however the G. I. P. Railway Officers' enquiry had admitted that the Scotch Blocks had been out of order on the day of the accident I endeavoured to obtain evidence by

(*iii*) Photographs, measurements at site and certain practical tests carried out with both the Broad Gauge and Tramway trains.

16. The evidence is overwhelming that probably both scotch blocks and certainly the one on the north side of the diamond crossing, the direction from which the Tramway train was approaching, were out of order on the day of the accident.

17. The evidence as regards the Broad Gauge signal is conflicting. The G. I. P. Railway witnesses, all say that the signal was lowered for the Broad Gauge train to proceed over the diamond crossing. Two of the outside witnesses brought forward by Mr. Nusserwanji say the signal was at danger for the Broad Gauge train. These were obviously coached and their evidence I consider as unreliable as that of the others who were obviously interested. We have however psychological, and one or two material, considerations affecting the point.

(*i*) The guard, who was in the leading brake-van of the Broad Gauge train, was controlling it with the vacuum brake and was obviously on the alert.

(*ii*) The guard had 14 years' service and it should be almost part of his being that he should stop at a danger signal against him.

(*iii*) The guard belongs to a different department from that of the pointsman, is of a different caste and hardly knows him, so there was no reason why he should not stop at the signal and report the signalman, an engineering employee, for being absent and delaying his train unnecessarily. This would be quite a normal action on his part.

(*iv*) The guard knew that in the collision he would suffer personally, be injured certainly and may be killed.

18. The experiments with braking, etc., were carried out by Mr. Vears, Transportation Inspector and Mr. Lewis, Assistant Superintendent (Power) of the G. I. P. Railway with the Police Inspector present in the case of the Narrow Gauge Tests. These tests prove conclusively the following facts :—

Tramway Tests.

(*i*) At a speed of 5 to 6 miles per hour, load 10 empty trucks, on sudden display of danger flag the driver stopped his train in 10 feet.

(*ii*) At a speed of 8 to 10 miles per hour over Diamond Crossing, load 12 empty trucks, train stopped in 15 feet.

The normal speed of the Tramway is probably 5 to 6 miles per hour but when tested 8-10 miles an hour was easily attained and with regulator full open 12 miles per hour.

Broad Gauge Tests.

Full load 52 wagons, as with accident, K|8 type engine but with Dreadnought Ejector instead of B type as was fitted on the day of accident. Vacuum 12 in. on engine and 10 in. in brakevan as stated to be on the day of the accident.

(*i*) Speed 15 miles per hour, steam shut off. Brakes applied from Guard's van 276 feet from Crossing. Train came to a stand in 30 seconds in 248 ft.-6 in. or 27 ft.-6 in. short of the Diamond Crossing.

(*ii*) Speed 15 miles per hour over crossing, regulator opened. Brakes applied from Guard's van 276 feet from crossing. The train came to a stand in 55 seconds, 352 feet over the Diamond Crossing or 628 feet after the signal to stop was given.

It is significant to note from the measurements I made that if the brake-van and wagons had not derailed and piled up where they did, but had kept to the track, the brake-van would have been stopped 384 feet over the Diamond Crossing as against 352 ft. in Test (*ii*).

19. Allowing for the extra braking action of the derailed vehicles as compensated for by the hesitancy of the guard in applying his full vacuum and first shouting before applying his brakes, a probable somewhat lower vacuum pressure, a slightly higher speed of the train, say 20 miles per hour instead of 15 miles per hour for the test, and there cannot be much error in assuming that the guard realised the possibility of a collision and applied his brake at about 270 feet from the crossing and the actual conditions otherwise were as represented in Broad Gauge Test No. (*ii*).

Rating the average speed over this 270 feet rather high at 15 miles per hour or 22 feet per second the 270 feet were covered in 12 seconds.

20. Now according to the G. I. P. Railway evidence the Tramway train when struck had the 5th tip wagon over the centre of the crossing and according to Mr. Nusserwanji's evidence it was the 3rd wagon. We can assume the 5th as the worst case and the Tramway engine 50 feet over the crossing. The train was avoiding the crash and racing as fast as it could, 12 miles per hour or 17 3|5 feet per second.

So that, in the 12 seconds it took the Broad Gauge train to reach the crossing the Narrow Gauge engine was 17 3|5 × 12 = 211 ft. further back than when it was struck. I have assumed that the average speed of the Tramway was only 3|4th of 12 miles per hour or about half way between its normal speed of 6 miles per hour and the maximum speed the driver could attain in trying to cut across the front of the Broad Gauge train.

21. The situation then was that the Guard of the Broad Gauge train began to apply his brakes 270 feet from the crossing and that he needed somewhat more than 600 feet in which to stop his train and only had 270 feet, while the Tramway driver had 40 feet to the scotch block and rather more in which to stop his train and needed only 10 to 15 feet and could very easily have avoided the accident even then.

Conclusions.

22. (*i*) I consider that the Scotch Blocks at the Diamond Crossing were out of order and the Signal Maintenance staff of the G. I. P. Railway to blame for this, both Maintainer and Inspector, because their drawings showed the existence of this signalling and locking.

(*ii*) I am of opinion that the Signal for the Broad Gauge train was lowered but it is only granted as a distinct benefit with a somewhat grave doubt.

(*iii*) I consider that even with the signal lowered but with the weather conditions, the views possible of each other and ordinary vigilance, both the Tramway Driver and the Broad Gauge Guard are responsible for the collision as either could have avoided it.

We have here the same mentality as in the case of two motor drivers approaching a road crossing at right angles. One hopes the other will stop and the other hopes he can accelerate and get through.

Recommendations.

23. I have to recommend early revision of the special rules for working trains into the Kymore Siding, the correction of the working diagram and the provision that Guards and Drivers working into the siding are familiar with the rules.

3. MADRAS AND SOUTHERN MAHRATTA RAILWAY.

Derailment of No. 26 Passenger train, at mile 62|5, between Puttur and Nagari Stations on the 12th October 1934.

LETTER FROM MR. R. HATT-COOK, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, BANGALORE, No. 34|303, DATED THE 23RD OCTOBER 1934. (6055-T.)

In accordance with Rule 7 of Railway Board's Notification No. 1926-T., dated 19th March 1930, I have the honour to forward herewith my report on the enquiry held by me at Nagari station on the 18th October 1934, concerning the derailment of No. 26 Passenger *ex*-Raichur to Madras, at mile 62|5, between Puttur and Nagari stations, at 12-25 hrs. on October 12th, North West Line, Madras and Southern Mahratta Railway.

Description of the locality.

2. The accident occurred at mile 62|5 at about 12-25 hrs. on October 12th near the bottom of a down grade of 1 in 97, 1.5 miles long, at the site of a 9′ arch bridge No. 100 which is built in granite, the arch ring is 1′—4″ thick which was sound except for cracks visible in the cement mortar at the soffit ; three wooden sleepers were in the track before the accident just over the centre line of the arch to spread the weight, the cushion being 8″ below the bottom of these sleepers two of which showed signs of decay under the chairs. The bank at site is 10 ft. high and is composed of sand and clay making quite a good bank which is well maintained.

3. The track is composed of 80 lb. B. H. rails, 30 ft. long, which were laid new in this section in 1904, on cast iron pot sleepers and steel tie rods with gibs and cotters. The pots are packed with imported coarse sand. I examined the track carefully and had the sleepers opened out in two places in the vicinity of the accident. Gauge was about correct, nothing worse than 1|8″ tight being found. Cross levelling was about correct, the tie rods, gibs and cotters and pots were in good sound condition, only one or two of the cotters tested being found loose. The fish plates are fish bellied with 4 bolts per fish plate, all found tightly screwed up. The fish bolts removed from the joint where the rail was broken, were rather worn through creep, which has now been arrested owing to the use of Stewart steel keys, two at the joint sleepers, and 4 intermediate per rail, the remainder being teak keys which were sound. The rail joints were opposite one another, joint sleepers being spaced at 2′—2″ and the rails hogged, being low at the joints. A layer of stone ballast as blinding is spread over the sand ballast. The track is opened out annually for inspection of pots, packing, etc.

4. I was informed that tie bars seldom break and the fracture of pots is not serious. No serious loss of keys occurs on this section. The gang's gauge was found correct. No breakages of rails have been recorded in this section for the past 3 years. They have lost less than 5 per cent. of their weight. One or two of the damaged rails appeared brittle as there were bad cracks in the bent rails.

Description of the accident.

5. At the point of derailment about 4 ft. short of a joint which was 30 ft. ahead of the Nagari abutment of the 9 ft. arch bridge, the right hand rail was broken, one foot forward of this joint on the top and 1′—2″ at the bottom of rail, *i.e.*, a slanting break. The broken piece however would still be supported in the joint sleeper both vertically and laterally.

There were distinct signs of wheels mounting the rail about 4 ft. short of the broken rail, side abrasion being most marked. The distance from the broken rail to the front part of the engine where it stopped was 253 feet.

6. The train was composed of an XD type engine followed by 7 four wheeled motor vans four of which contained new motor chassis, one third class bogie, empty (except for one leper who was injured), one white G. I. P. bogie tourist saloon with attendant and electric fitter, both injured, 4 four-wheeled vans, then the train which was composed of 5 bogies.

7. The 7 four-wheelers were smashed to match-wood, also the third class bogie which was telescoped with the G. I. P. saloon, the leading bogie of which was pushed backward until it met the rear bogie. The saloon is seriously damaged. The remainder of the train was undamaged.

8. The track under the wreckage had not been disturbed after the accident, before my arrival. The broken rail was still fished up when I inspected the site on the 15th.

9. The engine and tender kept on the bank but the trucks were thrown to the right and landed at the foot of the bank. The bogie third and the saloon also remained on the bank.

10. There were no injuries to passengers, except the leper who was travelling without a ticket in the empty third class bogie. Four of the staff were slightly injured. First aid was rendered, equipment being with the guard.

11. The Accident Relief train from Arkonam arrived at mile 62 at 14-55 hours and the Perambur Relief train was the 50-ton crane arrived at 18-23 hours.

12. The engine was re-railed at 12 hours and the tender at 23-10 hours on the 13th October and pulled to Nagari.

13. The line was blocked for traffic for about 40 hours, transhipment being carried out. Through running was resumed by means of a diversion at 4 hours on the 14th.

14. The total damage is expected to be about 2 lakhs. The damage to the engine and tender, No. 862 XD class, last out of shops on 26th November 1933 for light repairs, was slight.

15. The maximum sanctioned speed of the section is 60 miles per hour. The train 26 Up left Puttur at 12-9, the time of the accident was 12-25, *i.e.*, 16 minutes for the 7 mile run with an intermediate stop at a flag station. The train was running late and actually lost on booked time between Pudi and Puttur the preceding block section. I should judge the speed from the above information obtained, to be about 40 miles per hour at the time of the derailment.

Evidence.

16. Examining the evidence it will be seen that most witnesses noticed the rail length with the ballast removed around and under the pots to lower the road ; even on the mate's own statement he was lowering a rail and removing earth from around 7 pots and under to about an inch inside the pots, and he had broken up the ballast inside the pots which would loosen it ; this he carried out on his own without asking for the Permanent Way Inspector to attend and without showing the signals as required by G. R. 215. He relied upon the engine to roll the track down. There is nothing to prove that the Permanent Way Inspector issued orders to lower the track, except the mate's own statement which I discredit, his own gangmen who gave their evidence in a very straightforward way tried to persuade the mate from doing so.

Conclusion.

17. Now as regards the broken rail which I inspected at site on the 15th, the break was about 1 foot from the end of the rail and fished up and as this piece would still be supported both laterally and vertically in the joint pot sleeper, I am of the opinion that the broken rail was not the cause but the effect of the accident, as there were distinct signs of wheels mounting the rail preceding the broken rail, there were also severe side abrasion marks causing burring over of this rail, due to very high side pressure. I therefore conclude that the derailment at this point was caused by some other influence and that other influence is found at the site of opening out the 7 pot sleepers with the ballast loosened around the rim and the ballast inside the pots broken up which would somewhat resemble very soft sand stone before being broken or stirred up with the packing implements. This point was 62′ short of the first mark of a wheel mounting the right hand rail. The engine must have lurched to the left very heavily owing to no solid support under the pots and when the point of solid support was reached, *i.e.*, packed and boxed sleepers, the engine lurched to the

right, there may have been another oscillation to left and right before the derailment. This severe oscillation set up all occurring in about one second which represents a distance of 60 ft. at 40 miles per hour, was, I conclude, the cause of the derailment, the broken rail being caused by probably one of the coupled wheels striking the rail preparatory to mounting it on a spread gauge which was noticed at about this spot by the Assistant Transportation Superintendent on his arrival at 3 P.M. There were marks of severe friction causing the metal to become blue-hot on the top part of the broken section which was broken to the shape of an arc on the top plane, the break spreading forward and downward at a slant, just as if it had had a severe side blow. There appeared to be a small flaw on the bottom of the rail.

18. On the leading right hand bissle wheel a very clear mark was seen, indicating that this wheel mounted the rail ; also on the left side of the engine a rivet head had been sheared off clean (vertically above the driving wheel) and the angle iron of the frame supporting the side foot plates pushed upward ; also new bright marks of severe rubbing on this angle of the frame at all four coupled wheels, there being little or none on the right side, indicating, so I conclude, that the engine on lurching to the left at the opened out pots compressed the springs to such an extent as to cause this ; it may also be possible that as the driving wheel showed the worst upward tendency by shearing the rivet and bending up the angle supporting the side foot plates that the out of balance weight was swinging upward tending to reduce the axle load on the rail, thus further compressing this spring and lifting the wheel.

19. My conclusions are therefore that owing to the unsupported and unpacked pots, under the rail, which was being lowered by the gang mate, which were stated to be actually suspended from the rail by several witnesses who were early arrivals at the scene, this is the sole cause of the accident. The mate is therefore guilty of breaking G. R. No. 208.

20. It should be noted that the Permanent Way Inspector seemed to pass along his section too often without stopping with his gangs to inspect their work and show them how to do it, especially at this spot 62|5 where he had noticed slacks occurring for several weeks back thus relying on instructions rather than seeing the job done. He did not consider the mate a reliable man and I therefore consider that he should have given more personal supervision than he did to this mate's work ; in this he failed.

Recommendations.

21. From my examination of the mate's service register and the statement of the Permanent Way Inspector it appears that this mate was hardly a suitable person to be employed as such, and I recommend that still greater precautions be taken to select carefully, gang mates, by having them examined in their work and capabilities by an Assistant Engineer and Permanent Way Inspector prior to appointment.

22. I examined the Engineering Manual and found that very clear orders are contained therein as regards the duties of Permanent Way Inspectors, road inspections, etc. Road books are also kept by them which are examined periodically by Assistant Engineers and District Engineers. I therefore cannot hold the Adiminstration at fault in their standing orders to Permanent Way Inspectors, as regards taking every precaution possible to prevent accidents due to faulty track operations, the mate apparently acting on his own initiative in this case.

4. BURMA RAILWAYS.

Derailment or No. 3 Up Mail at bridge No. 173, Mile 117, between Penwegon and Tawgywe-In on the Rangoon-Mandalay main line on the 15th December 1934.

LETTER FROM MR. E. C. WHELAN, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A, RANGOON, No. 27|19-A.|34, DATED THE 8TH JANUARY 1935. (6098-T.)

Description of accident.

At 0-7 hours in the morning of 15th December 1934, 3 Up Mail was derailed at bridge No. 173, mile 117, between Penwegon and Tawgywe-In on the Rangoon-Mandalay Main double line.

The train was running right time and stopped, as booked, at Penwegon Station.

At mile 117 a severe jolt was felt and the Engine YC165 left the metals on the south abutment of a bridge of three spans of 20 feet girders, traversed the bridge, tearing up the permanent way in the process and finally capsized on the west side of the bank of the North abutment, about 180 feet from the point of derailment.

The engine was followed by the B. B. L. 6356, and B. T. Cs. 1833, 1830 and 1832, all of which were capsized and smashed and thrown down the bank and across the down line. B. M. T. 6289 and B. T. S. 7193 were derailed and damaged but remained in an upright position on top of the piers and supported by the down line girders. The remaining six bogie coaches were not derailed and came to rest about twenty feet short of the South abutment of the bridge. The leading vehicle, B. F. S. 7200, had its leading end slightly crushed.

All the permanent way was torn off the up line bridge and the North approach up to the point where the engine was lying and the down track was badly distorted on the bridge.

The South ends of all the girders were pushed off their supports.

The fish plates from the joint on the West rail, immediately before the bridge, were found lying on the ballast close by, together with three fish bolts and nuts, all in an undamaged condition.

The fish plates of the corresponding East joint were found bolted side by side to the outside of the undisturbed rail and projecting beyond its end. The run off frame was displaced but intact and contained some partially re-driven dog spikes. These spikes must have been originally extracted and subsequently partially replaced as there was no sign of damage or distortion to the spike holes, which would have been the case if the spikes had been forced out in the course of derailment.

The telegraph wires were broken and communications between Penwegon and Tawgywe-In Stations were interrupted.

The driver and both firemen were seriously injured, one female 3rd Class passenger died of her injuries and twelve other passengers were injured.

A relief train from Pyuntaza arrived at Penwegon at 4.15 hours and another from Toungoo at Tawgywe-In, at 6.15 hours. The Rangoon relief train arrived at Penwegon at 8.40 hours.

Agent's Inspection Special was at Martaban on the night of the accident and was immediately diverted on receipt of the news at about 4 hours on 15th December 1934 and the party reached the site at about 11-40 hours.

The damage to engine and rolling stock is estimated at Rs. 36,000 and to Permanent Way Rs. 1,800.

Description of Locality.

The line is straight for miles on either side of mile 117. It is level for four miles beyond and half a mile in the rear, preceded by half a mile of 1 in 600 down and before that again, one and a half miles of level.

The up and down tracks are fully ballasted and consist of 60 lbs. F. F. rails dogspiked to hard wood sleepers and are in fairly good order. The height of bank is about six and a half feet.

The line is fenced and flanked on either side by thick jungle.

The Main Rangoon-Mandalay Road runs parallel at a distance of about three quarters of a mile on the West side.

The country appears to be sparsely populated but there are said to be two villages on the East side, about half a mile away.

The bridge on which the accident occurred is one of three spans of 20 feet girders on masonry piers and abutments. The bed is dry at this season. There was a ground mist on the night of the accident.

Conclusions.

There is no doubt that this is a case of deliberate train wrecking by a person or persons unknown.

A study of the site showed that both pairs of fishplates had been removed from the joints immediately preceding the bridge which was at a distance of about twelve feet from the girder ends. The dogspikes were removed from the run off frame and from the intervening sleepers and the rails sprung out at the joints and held in that position by partially replacing some of the dog-spikes and by bolting a pair of fishplates on to the outside of the joint of the undisturbed track, on the East rail.

It is impossible to say whether the track on the bridge itself was tampered with, as it was so badly smashed up and the debris scattered over a considerable area. It would not, however, have been necessary to do so in order to spring out the rails to the extent required, *viz.*, a distance of 4 or 5 inches at the end of a length of twelve feet of unspiked rail.

The loosened rail on the East side was found after the accident, lying up against the girders of the down line bridge and it had a deep indentation on the inside of the foot about six feet from its near end and thereafter, marks of scoring along the foot. These marks are exactly what might be expected from the wheels of an engine travelling at speed if the rails were arranged as previously stated and the leading wheel of the engine bears a mark which was probably caused by the impact with the foot of this rail at the point previously mentioned.

The exact arrangement of the West rail is doubtful but this is immaterial as the conditions on the East side were amply sufficient to cause derailment.

There is no reason to doubt that the driver was on the alert and I am of opinion that the state of the track would not have been apparent from the foot-plate, even if visibility had been better than he stated it to be, in his evidence.

I consider that the conduct of all the Railway Staff concerned in the accident was exemplary.

General.

The train was properly equipped with first aid box and good use was made of it in attending to the injured.

It was fortunate that there were doctors present amongst the passengers who willingly gave their services and the injured were promptly attended to and evacuated to the nearest hospitals with the minimum of delay.

Transhipment was arranged for between 3 Up and 4 Down and the down line was cleared at 1-50 hours on the following day and single line working introduced. The up line was cleared at 17-45 hours on 18th December 1934 and double line working resumed.

Enquiries were made into the numerous changes which have recently occurred in the personnel of gang No. 15 in whose length the accident occurred, with a view to the possibility of some disgruntled *ex*-gangman being concerned in the tampering with the track. The district appears to be a malarious and unpopular one and those men who have left have done so at their own request and I further had the assurance of the District Engineer that there were none such in the neighbourhood.

The train appears to have been well-filled with passengers and in view of the wreckage, the number of casualties is astoundingly small.

Police protection was promptly provided and no case of theft has been reported.

Recommendations.

The following cases of train wrecking have occurred in this neighbourhood within the last ten years :—

Date.	Place.	Train concerned.
1. 10th March 1924	Bridge No. 172 Mile 116/15 ..	368 Down Goods.
2. 28th January 1928	Bridge No. 161 Mile 110/1 ..	4 Down Mail.
3. 28th October 1930	Mile 144/17	4 Down Mail.
4. 1st June 1931	Bridge No. 170 Mile 116/10 ..	3 Up Mail.
5. 15th December 1934	Bridge No. 173 Mile 117 ..	3 Up Mail.

It will be seen that the neighbourhood is a bad one, at any rate as regards tampering with the railway track.

I do not see what further precautions can be taken by the Railway Administration in the interests of the travelling public but it would appear that some action is necessary on the part of the Civil Authorities.

With the exception of item 3 above, these cases have all occurred within a length of seven miles and I suggest that the imposition of Punitive Police or some similar measure be adopted in this neighbourhood so as to instill into the inhabitants the desirability of the avoidance of such occurrences.

5. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Derailment of No. 55 Up Passenger train on the Ahmedabad-Khed Brahma Branch, metre gauge, on the 18th February 1935.

LETTER FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, NO. 345, DATED THE 11TH MARCH 1935. (6155-T.)

Description of the Accident.

55 Up Passenger proceeding from Khed Brahma to Ahmedabad on 18th February 1935 when approaching Vadali, the station next to Khed Brahma, and when about 1|3rd of a mile outside the distant signal derailed on entering the curve at this point.

2. The engine ran off the bank, fell over on its near side and skidded along the ground coming to rest on its side. The first passenger bogie broke away at the engine coupling, followed the direction of the engine, ran down the bank on its wheels and came to rest parallel to the engine at an angle to the track and between engine and track.

The second passenger bogie fell over on its side on the edge of the bank. The next 2 bogies were derailed and the fifth bogie was derailed as to the leading bogie wheels only. The remaining 2 bogies of the train remained on the rails.

3. The track was damaged for 200 feet or so under the derailed vehicles. The rails were pushed out and turned over and in the case of 3 bearing plates, these were very strangely torn completely across, each into 2 pieces, parallel to the track.

4. The engine crew of three was imprisoned in the engine cab and climbed or were pulled out after the accident without much difficulty. All the three received minor injuries and were fortunate to escape so lightly. On account of a Mela at Khed Brahma although trains in that direction were very full, they were running practically empty from that station and the leading bogies were empty and no passengers by the train were injured.

5. Damage to Permanent Way and Rolling Stock is estimated as under :—

	Rs.
Permanent Way	450
Carriages	1,200
Engine	5,000
Total ..	6,650

6. The relief trains from Ahmedabad and Abu Road were summoned at 14-55 hours and arrived at Vadali at 1-10 hours and 8 hours respectively on the 19th. The arrival of the Ahmedabad train seemed to have been unnecessarily dilatory.

7. Medical aid was rendered promptly by the Medical Officer, Idar State, and the injured members of the engine crew were sent to Ahmedabad by 55 Up, reconstituted.

8. The Assistant Engineer, Permanent Way Inspector and Sub-Permanent Way Inspector were trollying on the section and the train had just passed their trollies a mile before the accident and these officials were therefore on the scene of the accident within 15 minutes of its occurrence.

Description of the site of the accident.

9. The accident occurred at mile 82|14. The train was 55 Up Passenger consisting of Engine 110 YF followed by 7 passenger bogies. The point of derailment was approached by a falling gradient of 1|400 for half a mile preceded by a level section. The alignment is a straight for 3|4ths of a mile to the point of derailment which is at the springing of a 2° curve and 1|3rd of a mile outside Vadali distant signal. The facing points of Vadali are at mile 82. The weather was fine with bright sunshine. The maximum permissible speed of trains on this section is 25 miles per hour.

10. The track is built up of old 41¼ lb. rails held by 4 spikes per sleeper on the straight and 6 spikes per sleeper on curves. The joint sleepers are provided with steel bearing plates. The ballast is a full section of good broken stone.

11. One rail per 4 miles of the 41¼ lb. rails has recently been weighed and found to be of 39¼ lbs. section as an average, but I would suggest that the odd lightest rail is probably 38 lbs. The track was well-maintained but was of very light structure for engines over the 8 ton axle load, which had been conceded lately.

The Evidence.

12. The evidence as to the cause of the accident was taken in three directions :—

(*i*) As regards the condition of the track.

(*ii*) Concerning the speed of the train.

(*iii*) Concerning the running of the new YF type engines.

13. The condition of the track was good, but, with rails of 39 lb. section and n + 1 wooden sleepers and spacing in some few cases of 3′—5″, was the absolute minimum for the recently granted sanction of axle loads over 8.2 tons to be run at 25 miles per hour as a maximum. There was little or no margin to cope with any disregard of the speed restriction. Finally, on the day of the accident the gang was working on the track at mile 82|13-15 and the derailment was at mile 82|14.

The line had been opened out, aligned and packed. The Head Mate and Mate in their original statement to the Executive Engineer stated that this was the condition of the line at 14 hours when the derailment occurred. At my enquiry they went back on this and said the line was in addition completely boxed and only the dressing of the ballast was left for the afternoon's work. I consider the first statement was the truth as it is the normal method of work and that therefore the line was incompletely boxed when the accident occurred.

14. As regards the speed of the train, the driver said he was running at 22 miles per hour and the guard estimated the speed at 20 miles per hour. The Assistant Engineer and Sub-Permanent Way Inspector on a trolly were passed by the train about 2 minutes before the accident. Both at the time remarked on the excessive speed of the train and the dangerous swaying of the engine and noted the circumstances as to be reported. The Executive Engineer had recently reported this very train for running at 40 miles per hour as actually timed by him and the Assistant Engineer had similarly reported 35 miles per hour.

15. The time table allows 18 minutes for the run of this train from Khed Brahma to Vadali a distance of 7 miles and the train I understand keeps time consistently. Allowing 2 minutes for the halt at Vadali and even 2 miuntes lost in starting and slowing down for an uninterlocked station yard at Vadali, the official allowance for the run is 14 minutes for 7 miles or a speed of 30 miles per hour. The time table therefore actually requires drivers to exceed the permissible maximum speed.

16. Finally as an indication of the speed of the train when the accident occurred, we have the position of the engine about 200 feet from the point of derailment. It had not rolled there on its wheels but it had skidded there on its side for at least 1|3rd of the distance. I consider this as an indication of a speed over 30 miles per hour at least.

17. I tested the running of the new YF engines on engine 418 (Modification No. 2) and engine 108 (Modification No. 3) the latest. I also tried an F3 class engine.

18. Engine 418 (Modification No. 2) was of exactly the same type as engine 110, the derailed engine. At 18 miles per hour a bad lateral movement began to develop which was very marked at 20 miles per hour and above this speed the engine began to hunt to an alarming extent.

Finally, at any speed, when the regulator was suddenly closed the lateral motion of the engine and the hunting were increased markedly for an appreciable period till the engine steadied again with the reducing speed.

On my experience of this running I issued my telegram No. C|8 requiring the administration to discontinue running these engines on this branch or to restrict their speed to 20 miles per hour as an absolute maximum.

19. Engine 108 (Modification No. 3) ran comparatively smoothly at 25 miles per hour but at speeds above began to sway and in my telegram No. C|9 I accepted speeds of 25 miles per hour for this engine and its type of which no others exist at present. The F3 engine was very much more stable at 30 miles per hour than 108 at 25 and 418 at 18.

20. After the derailment certain distortion of the track by the engine was noted at 5 points which had occurred before the actual derailment. The distortion was in the form of a sharp outward bend of the rail over one sleeper. The spikes at these points had been bent over. This was obviously the result of the hunting and the force of the blow is indicated.

21. At the place of first derailment not only had the spikes been bent back but the force was such as to split the bearing plate, which indicated not only the excessive blow but that the inner spike was holding remarkably well.

22. The violence of the hunting thus shown is a further indication that the speed of the train was considerably more than 25 miles per hour.

23. It will be seen therefore that the conditions were such that the track was of minimum strength for the speeds and axle loads and no latitude could be allowed in the matter of higher speeds or instability of the locomotive and that great latitude had been accepted by the administration in both directions. The Engineers had drawn attention to excessive speeds, and the time table on this run at least, allowed insufficient time and the engines were admittedly unstable at even the sanctioned speeds. The administration had with it the report by Messrs. Fosberry and Wright, who say as regards these YF engines on their trials on the Khed Brahma Branch :—

> " We are of opinion that neither modification No. 1 of the YF engine nor modification No. 2 in their present condition have a sufficient factor of safety for safe running on branch lines laid with 41¼ lb. rails and having a sanctioned speed of 25 M. P. H."

Conclusions.

24. The causes of the accident I consider were :—

(*a*) The excessive speed at which the train was running.

(*b*) The instability of the engine at any speed over 20 miles per hour greatly increased when shutting off steam.

25. The engine was hunting badly just before it came to the point of derailment. The driver then closed his regulator for Vadali and we had :—

(*a*) Greatly increased hunting.

(*b*) The springing of a curve.

(*c*) An incompletely boxed line.

These 3 conditions combined were enough to cause the accident.

General Remarks.

26. The administration during the last 10 months has required early sanction to :—

(1) Increased speeds on the branches.

(2) The running of YF engines on all branches.

Before sanction can be given it is in my opinion necessary for the administration to :—

(1) Provide a stable YF engine of the type of No. 108 with improvements ;

(2) Ensure the observance of speed restrictions ; or

(3) Provide a track strong enough to allow great latitude under (1) and (2).

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PRB-RA/18.

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Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 30th September 1935

No. 18.

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1. EASTERN BENGAL RAILWAY.

Derailment of No. 239 Up Passenger train at the Up Facing Point of Salmari Station on the 10th May 1935.

LETTER FROM MR. R. B. SETH, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, No. 32|119|XIII|35, DATED THE 22ND JUNE 1935. (6236-T.).

Brief Description of the Accident.

1. At about 12-35 hours on the 10th May 1935, 239 Up Passenger derailed at the up facing point of Salmari Yard. The accident resulted in serious injuries to 6 passengers, one of whom subsequently died and slight injuries to 6 others. The driver of the train sustained serious injuries and three other Railway employees slight injuries. The total damage to Rolling Stock amounted to approximately Rs. 11,000 and to track Rs. 1,200.

2. The engine (Y.B.414) mounted the rail just at the up facing point, derailed and capsized and came to rest flat on its right side at the foot of the bank 175 ft. from the facing point. The track from the back of crossing to where the engine capsized was uprooted. A four-wheeler goods vehicle next to the engine capsized on the left side and was smashed and pierced by the uprooted rails. A six-wheeler Brake Van next to this was detached from the train, thrown clear out ahead of the four-wheeler towards the left and was badly smashed. Next were three third class bogies the first one of which was derailed of all the wheels and was telescoped into the four-wheeler, the second one derailed of all wheels and canted over and the third derailed of the rear bogie wheels only. Behind these were an Inter and Third class bogie and an upper class bogie ; the front bogie wheels of both of which were derailed, the rears remaining on the track. The underframe with the body of the upper class coach left its bogie wheels and mounted and telescoped into the rear of the Inter and Third class coach. The remainder of the train, four passenger bogies and four coaching goods suffered no damage.

3. The injured received very early medical attendance. First aid was given by the Station Master, Salmari, and a local medical practitioner who reached the site within five minutes of the accident. The sub- Asstt. Surgeon from Barsoe arrived within three quarters of an hour after the accident and the Asstt. Surgeon, Katihar at 14-45. The injured were taken by train at about 16 hrs. to Katihar Railway Hospital.

4. The Relief Train from Katihar arrived at 14-45 and the line was cleared for through working at 4-15 hours on the 11th.

Description of the Locality of the Accident.

5. The site of the accident was the outermost facing point (Mile 302.85) at the Barsoe end of Salmari Yard.

Salmari Station is situated at Mile 303-04 on the Parbatipur Katihar Metre Gauge Section of the Eastern Bengal Railway. It is connected by means of Neals Token Instrument and telephone with Barsoe Jn. in the Down direction and Sonaili in the Up direction.

6. The Station Yard consists of three running lines. No. 1 the Main Line is the platform line, Nos. 2 and 3 are the 2nd and the 3rd loop. There is also a goods loop with a dead-end taking off from the No. 1 line.

The yard is non-interlocked but all the points on the Main or No. 1 line are fitted with one-way lock so that when the key is out of the lock, the points remain set and locked for the Main Line ; in addition to these the points are also clamped and padlocked. The keys of the one way lock as well as that of padlocks are kept in a point key box in Station Master's office. The points are provided with indicators. The signals at this station are only Outer and a Home in each direction.

7. No. 239 Up on the day of the accident was to be received on Main or No. 1 line. For reception of trains on Main Line the Station Master on duty

makes over only the relevant line labels to the pointsman and no keys. The pointsman then goes over to the outermost facing point, sees that all the points are correctly set and then exchanges hand signals with the Station Master on duty. The latter then sees from the indicator that the points are correctly set and then lowers the signal.

8. The line is straight from Mile 300.58 to the site of the accident (302.85) and about 0.19 of a mile beyond. It is level from Mile 298.13 to Mile 303.71, *i.e.*, 0.96 mile beyond the site of accident.

At the Down end of yard (Barsoe Side) there is a girder bridge—3 of 40′ span—the up end of which is only 115 ft. from the Up facing point No. 1, the site of the accident.

9. The next facing point, in the Main Line, point No. 3 is 133′—10″ away from No. 1 and there is a level crossing in between at 49′—0″ from the facing point No. 1. The line between crossing of No. 1 point and point No. 3 was uprooted.

10. The accident took place in broad daylight under clear weather conditions, on a very hot day and at the hottest time of the day. The maximum temperature in shade as recorded on that day was 105.6°F.

Items of particular interest and evidence.

11. *Engine.*—The Engine is YB type and has a good record. It was erected in Saidpur Shops and started work from 21st November 1929 and completed on 31st March 1934 a mileage, mostly in passenger service, of 1,32,000 after which it was sent to Saidpur Shops for heavy repairs and was turned out after repairs in December 1934. It was stored at Katihar up to 30th April 1935 and put on Katihar-Parbatipur passenger train link on 1st May 1935 ; on 2nd May 1935 the driver Shamsher Ali, who was also the driver on the day of the accident, reported hot axle box which was attended to after which it remained spare in shed from 3rd to 6th May. On 7th May it was put back in service and did about 510 miles before meeting with the accident ; the total mileage done by it since being turned out of shops being 824.

12. There is conclusive evidence that on the day of occurrence the engine was behaving normally and from the evidence of Mr. A. K. Mullick, Asstt. Loco. Supdt., Lalmonirhat, who examined the engine just after the accident it is clear that there was nothing wrong with the engine. This is further borne out by the fact that after being derailed the engine was attached to the Relief Train and pulled to Katihar.

13. *Facing Points.*—The points both No. 1 and No. 3 were correctly set, locked, clamped and padlocked and there was no defect in the points. 'Split Point', therefore, can be definitely ruled out.

14. *Track.*—The track consists of 60 lb. B.S.S. 'R' Rails, 36′ long laid in 1932 with four-holed flangeless fishplates on N + 2 Sal sleepers laid in 1932, with 8 dog spikes per sleeper at the joint and 4 at the intermediates, the line is fully ballasted.

15. Creep is bad on the section but no anti-creep devices have been put in. There have been cases of buckling of track in hot weather and two occurred in this section in the month of April 1935.

16. On the 15th May, on the day of enquiry, at about 16 hours I examined the track on the bridge and beyond, towards Barsoe side, and found that all the joints on the bridge and 39 joints beyond (about 1,400 ft.) of the right hand rail (facing Katihar) were jammed and had no gap left for expansion and that this rail was creeping towards Katihar the creep being about 11″ on the bridge and steadily increasing to 20″ about ¼ mile away from the bridge. The left hand rail on the length had a variable expansion varying from Nil to ⅝″ but about 1,500 feet beyond the bridge (towards Barsoe) all the joints in the rail were closed, with no expansion, gap, for about 2,000 feet.

Conclusion.

17. The maintenance of the track was not of a sufficiently high standard, there was creep in the section and a large number of joints were allowed to be jammed leaving no provision for expansion. On this hot day and at the hottest

time of the day, the track which had 42 rail joints jammed of one rail must have been in great stress which could only be relieved by distortion of the track. The track was held laterally by the bridge over which it could not distort and by the points and the only way it could relieve itself was by distortion on the short length of 115 feet between the points and the bridge. In my opinion this distortion did occur and was the cause of the accident.

18. This distortion took place suddenly as the engine passed the bridge and communicated its lurch to the length of 115 ft. of track (between the bridge and the point) which then sprang out into an S curve. This is borne out by the evidence of the pointsman, who was present at the points No. 1 and had this portion of the track in view and who states that he did not notice anything unusual with the track and also by the evidence of the driver, who could easily see the track from quarter of a mile, that he did not notice anything wrong with the track till he crossed the bridge.

19. The driver applied the brake suddenly when his engine started rolling and pitching ; this aggravated the matter. From the extent of the damages and the distance the engine has travelled on this hot dry day after the application of the brake I am of opinion that he was travelling at a speed in excess of 10 miles per hour required by G.R.90 over the non-interlocked facing point. It is notorious that drivers, especially when proceeding on the straight, do not usually observe this restriction of 10 miles per hour.

20. I do not hold anybody directly responsible for this accident caused by buckling and aggravated by sudden application of brakes but consider that more vigilance should have been exercised by the Maintenance staff and the track should have been better maintained especially on the bridge and its approaches and near the points. The Permanent Way Inspector and the Sub-Divisional Officer according to their evidence have not been making as frequent inspections as they should have ; however, both of them and the Executive Engineer had been on the section for a very short period and were new to the local conditions.

Recommendations.

21. The section should be fully provided with creep anchors before the next hot weather.

22. Orders should be issued that when a specified number of consecutive rail joints on the same line of rail are jammed the Permanent Way Inspector or Sub-Inspector must correct expansion immediately. I would suggest the number to be specified as 10 for 36′ rail and 12 for 30′ rails.

L192RB

2. EASTERN BENGAL RAILWAY.

Collision between No. 600 Down Goods and No. 38 Down mixed trains between Ichhapur and Barrackpore on the 15th May 1935.

LETTER FROM MR. R. B. SETH, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, No. 937|XIII|35, DATED THE 15TH JULY 1935. (6240-T.)

I submit my report of the enquiry held by me into the circumstances attending the collision between 600 Dn. Goods and 38 Dn. Mixed trains which took place, at about 3-15 hours on the 15th May 1935, at Mile 14|25 between Ichhapur and Barrackpore on the Main Line of the Eastern Bengal Railway. I held the enquiry on the 18th May 1935 at Barrackpore and took some further evidence on the 20th May 1935 at Calcutta.

Description of the Accident.

2. At about 3-15 hrs. on the 15th May 1935, No. 38 Dn. Mixed Train collided with the rear of No. 600 Dn. Goods train which was standing on the Down Main Line at the Down Outer Signal of Barrackpore. As a result of the accident two persons were injured ; a passenger of No. 38 Dn. train who received slight injuries and the Guard of 600 Dn. who received serious injuries. First Aid was rendered at the site by Guard of 38 Dn. train and a Parcel clerk travelling in the same train. The injured guard was removed in an Ambulance Van to the Railway hospital at Calcutta, where he was admitted at about 7-30 A.M., after having been taken to and refused admission in the hospitals at Barrackpore. I regret to report that the Guard, Babu Gorakh Pershad, of 600 Dn. succumbed to his injuries and died in the Railway Hospital, Calcutta, at 8-40 P.M. on the 25th May 1935.

3. No. 600 Dn. Goods train consisted of ninteen four-wheeled covered goods wagons and a four-wheeled brake van drawn by S. G. C. 2 Class Engine No. 228 and was vacuum braked throughout. Its total weight and overall length, including the engine and tender, were respectively about 488 tons and 684 ft.

4. The damage sustained by this train in the collision was confined to 3 rear vehicles. The Brake van (E. B. 524) was wrecked, its roof and body were thrown on the Up Quadruple Line about 50 ft. ahead of the point of impact and the underframe pushed about 100 ft., swung round fouling the Up Quadruple Line and was partly mounted over by the engine of the 38 Dn. which derailed fouling the Up Main Line. The wagon, (BNR C.G. 7510) next ahead of the brake van mounted the G. I. P. C.G.2724 immediately in front of it and had its underframe and fittings smashed. The G. I. P. C. G. No. 2724 remained on the track but was badly damaged having its sole bars, head-stock, axle guard and buffers completely smashed.

5. No. 38 Dn. Mixed Train which carries through passengers from stations Poradaha and above to Calcutta consisted of 14 four-wheeled fish-van and covered goods wagons and 5 bogie passenger coaches drawn by H. P. C. I Class Engine No. 39 and was vacuum braked throughout. The total weight and overall length of the train, including the engine and tender, were about 469 tons and 853 feet respectively. The engine was derailed and was slightly damaged at its leading end ; the vehicles of the train were undamaged.

6. Total damage to the engine and rolling stock is estimated at Rs. 4,000 and to the track Rs. 150.

7. Both Up and Down Main Line and the Up Quadruple Line were blocked as a result of this accident and as the Down Quadruple Line had already been blocked at Kankinara due to another accident at 23-40 hours, on 14th May 1935, all the four lines were blocked for about 2½ hours. The obstruction on the Up Main Line was removed at 2-40 hours and single line working by this line was introduced at 5|52 hours. The block on the Down Quadruple at Kankinara was removed and double line working by Up Main and Down Quadruple lines introduced at 7-52 hours.

8. The Relief Train arrived from Calcutta at about 6-30 hours and all the lines were cleared and normal working resumed at 13-40 hours on the 15th May 1935.

9. 22 Up and 27 Down trains suffered detention, the average detention to Up trains being about 2 hours and 15 minutes and to Down trains 2 hours and 52 minutes.

10. The night was fine with good visibility.

Description of the Locality of the Accident.

11. The accident occurred at Mile 14|25 on the Down Main line between Ichhapur (Mile 16.72) and Barrackpore (Mile 13.91) about 1,180 feet from the Down Main Outer of Barrackpore where 600 Down train had been stopped.

12. There are four running lines between Ichhapur and Barrackpore, Up and Down Main and Up and Down Quadruple. At the site of the accident all the lines are on a curve of 10,560 feet in radius, left handed for Down trains, and though the country is open and there are no obstructions yet due to the curve it is not possible to be definite as to which of the four lines is occupied. This is the only curve between Ichhapur and Barrackpore and starts about 1,830 feet ahead (Ichhapur Side) of the site of the accident and is some 3,780 feet long.

13. From Ichhapur there is a falling grade of 1 in 850° for about three-fifths of a mile, thereafter " Level " for one mile and then a rising grade of 1 in 800 for 1,270 feet to the point of collision.

14. Ichhapur Station is worked as Class ' B ' Station both for Main and Quadruple lines. It has only one cabin which is connected in the Up direction with Shamnagar Cabin for the Main Line and with Kankinara Cabin for the Quadruple line and in the Down direction, both for Main and Quadruple Lines, with Barrackpore North Cabin by Pryce and Ferreiras Electric Block Instruments and Telephone. The cabins at Ichhapur and Barrackpore are manned by Block Signalmen who work the Block Instruments, points and signals and maintain necessary Train Register Books.

15. For the Down Main Line Ichhapur has three Starter Signals, the first Starter is near the down end of the down platform and is designated as Signal No. 4, the second starter is called Signal No. 5 and is on the same post as the Up Quadruple Outer and Warner, 2,473 feet ahead of the Signal No. 4, the advanced Starter is numbered 6 and is situated 4,150 ft. ahead of this Signal No. 5 and is at the down end of the down platform of Palta, a ' D ' class station between Ichhapur and Barrackpore. This Advance Starter No. 6 is only 3,762 feet from the Barrackpore Down Main Outer which is visible to the drivers from here.

16. The Advance Starter No. 6 is operated by means of an electric motor mechanism and can only be lowered if the line clear has been obtained from Barrackpore and the track between it and the down main Outer Signal of Barrackpore is clear. After being lowered it automatically goes back to danger as soon as the engine of a train passes it and is locked in that position till the whole of the train has passed inside the down main outer signal of Barrackpore and a fresh line clear has been obtained by Ichhapur from Barrackpore. This Signal is also held in the ' On ' position if there is a failure of mechanism.

17. The section between Ichhapur Down Main Home Signal (No. 3) and Barrackpore Main Outer Signal is track circuited. This track circuit is indicated in the cabin at Ichhapur and is divided into four sections, *viz.*, A, B, C and D and functions as follows :—

Section " A ".—Between the down main advance starter No. 6 and Barrackpore down main outer, when occupied, locks Signal No. 6.

Section " B ".—Between the down main advance starter No. 6 and down main starter No. 5, when occupied, locks signals Nos. 5 and 4 points No. 15 (Points 15-15 are crossover points from the Factory Siding at Ichhapur to Up and Down Main).

Section " C ".—Between the down main starter No. 5 and cross over points 15-15, when occupied, locks signals Nos. 3 and 4.

Section " D ".—Between cross over points 15-15 and down main home No. 3, when occupied, locks signal No. 3.

Evidence and Conclusions.

18. On the night of the accident No. 600 Down Goods train arrived at Ichhapur at 1-47 hrs. and was shunted to the Factory Siding where it had some work to do and gave way to No. 36 Down Mixed Parcel and Goods train which was allowed to run through Ichhapur 36 Down train passed the Advance starter No. 6 of Ichhapur at about 2-49, at which time the ' Train entering the Section ' for 36 Down was sent by Ichhapur to Barrackpore North Cabin ; this train was detained at the down main outer of Barrackpore as the home signal of the down main loop on which it was to be received at Barrackpore was found to be out of order, it was, however, received on the down main line and the ' Train out of Section ' for it was sent by Barrackpore North Cabin to Ichhapur Cabin at 3-2. In the meantime as 600 Down was ready it was started from the Factory Siding of Ichhapur at 2-53, four minutes after the ' Train entering Section ' had been sent for No. 36 Dn. by Ichhapur to Barrackpore North Cabin and was allowed to proceed to the Advance starter, No. 6 where it was stopped. On receipt of ' Train out of Section ' for No. 36 Dn. from Barrackpore North Cabin, Ichhapur asked and Barrackpore North Cabin gave line clear for No. 600 Dn. Goods at 3-3 and the ' Train entering Section ' for this train was sent by Ichhapur to Barrackpore North Cabin at 3-4. This train was held up at the down main outer of Barrackpore as No. 36 Dn. was occupying the down main line and the signals could not be lowered till No. 36 Dn. left Barrackpore, the signals were actually lowered at about 3-15.

19. At 2-56, about three minutes after starting No. 600 Dn. from his Factory Siding Ichhapur gave line clear to Shamnagar for No. 38 Dn. Mixed, for which he received ' Train entering Section ' report from Shamnagar at 3-4 and gave Shamnagar ' Train out of Section ' at 3-9.

20. All the evidence agrees up to this point ; the evidence is conflicting regarding the signals which were lowered at Ichhapur for No. 38 Dn. Block Signalman of Ichhapur, Mohammed Syed Khan, stated that he lowered Down Outer (No. 2), Home (No. 3) and First Starter (No. 4) and did not lower starters Nos. 5 and 6. The first fireman of 38 Dn. Amiruddin stated that all the signals at Ichhapur were lowered for 38 Down and that he " Particularly noticed that the platform starter, advance starter and Palta starter were all lowered ". The driver of No. 38 Dn., Abdul Rahaman, in his evidence on the day of the enquiry stated that " All the signals, the Outer, the Warner, the Home, the Platform Starter, the Advance Starter and Palta Starter were lowered for me " and when questioned was very definite that he himself saw the starter at Palta (Advance Starter No. 6) was lowered. On the 20th May 1935 this driver, Abdul Rahaman, came to my office with the District Loco. Superintendent, Mr. MacAulay, and stated that he had made a mistake in his previous statement as he was confused and worried at that time and gave another statement in which he stated that " I did not actually see the Palta Starter (Advance Starter No. 6) but depended on my fireman for the information that it was lowered. After passing the advance starter Ichhapur (Starter No. 5) I was wiping perspiration from my face, as my fireman informed me that Palta signal was lowered I did not look for it as it was on his side. Moreover as I looked down I found that the Barrackpore Outer was down and I concluded that the fireman's statement must be correct ".

21. The Advance Starter, signal No. 6 of Ichhapur, could not be lowered as section " A " of track circuit was occupied by No. 600 Down which had locked Signal No. 6 and I am of opinion that train No. 38 Dn. passed it at danger.

22. Regarding signal No. 5 the intermediate starter at Ichhapur Block Signalman, Mahammed Syed Khan, stated that he did not lower it and the reason advanced by him for holding No. 38 Dn. at No. 5 and not allowing it to proceed as far as No. 6 was that he wanted to keep the train within his sight so that he may not forget about it. This might have been a good reason for holding the train and delaying the traffic if the track circuit was not indicated in his cabin. The very object of track circuiting and of providing an extra starter signal for down main line at Ichhapur is to allow trains to proceed as near Barrackpore as possible and thus expedite traffic. Md. Syed Khan had the movement of the train indicated to him on his track circuit indicator throughout its career between Ichhapur and Barrackpore and had no valid reason not to lower signal No. 5. I am inclined to believe that this signal was lowered.

23. It appears that what may have happened in this case was that Signal No. 5 was lowered for No. 38 Down but signal No. 6 was not when the engine of No. 38 Down reached No. 6 which is remotely located, 1¼ miles away from Barrackpore, the driver, as per his second statement, saw the Dn. Main Outer signal of Barrackpore lowered, which probably had just been lowered for No. 600 Down, and might have taken it as being lowered for himself and expecting that the advance starter No. 6 will be lowered as a matter of course ran past it at danger.

24. There is also conflicting evidence regarding the headlight of engine of 38 Down. The driver and the fireman stated that the headlights went out of order when they left Naihati whereas the Guard of the train, V. Pereira, stated that he noticed it burning at Shamnagar where the train stopped last, the Block Signalman of Ichhapur also stated that he saw it burning when the train passed his cabin and finally Guard Gorakh Pershad of No. 600 Down stated that he saw it burning when the train was approaching his Brake Van just before the accident. I believe the evidence of the latter and I think the headlight was burning and was damaged after the accident.

25. I am of opinion that the driver, Abdul Rahaman, of No. 38 Down Mixed was responsible for this collision by a breach of Rule 79, Chapter II, of the General Rules for Indian Railways, in that he passed the advanced starter signal No. 6 of Ichhapur at danger. He is a man of 50 with 27 years' service of which 14 years he has worked as driver, and has a good record.

26. Some measure of responsibility must also be taken by the fireman of No. 38 Down, Amiruddin, who gave wrong information to the driver regarding the position of the advance starter signal No. 6 of Ichhapur.

3. GREAT INDIAN PENINSULA RAILWAY.

Accident to S. 30 Up Goods train at Chitrakot Station on the 16th June 1935.

LETTER FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, No. 1102, DATED THE 20TH JULY 1935. (6288-T.)

1. I beg to submit a full report on the accident to S. 30 Up Goods Train at Chitrakot Station on the Jhansi-Manikpur Section of the G. I. P. Railway which occurred at 19-50 hours on Sunday, June 16th, 1935.

Description of the Accident.

2. S. 30 Up Goods train from Manikpur was to run through Chitrakot Station at 19-50 hours on Sunday, June 16th. By the Station Master's orders the train was run through on the Loop or Platform Line of the Station.

At the trailing end of the yard and taking off the loop line is a short dead end used for loading and unloading wagons. The points leading to this dead end were set for the dead end, and the goods train, taking these points facing, entered the dead end and crashed into 2 empty and 1 loaded wagon standing in it. The very substantial buffer was broken up and carried away, the three wagons from the dead end were pushed down the bank, through the ditch and piled up on the slope of the bank of a road crossing the Railway here. The engine came to rest in the ditch, the 4 leading wagons of the goods train were thrown and partly capsized to the right across the main line. The 5th and 6th wagons were derailed on the bank of the dead end while the remaining 27 wagons of the goods train remained on the rails.

Description of the Site of the Accident.

3. Chitrakot Station is the 3rd station from Manikpur on the Jhansi-Manikpur Section of the G. I. P. Railway. Chitrakot is 24 miles from Manikpur and 806 miles from Bombay *via* Manikpur.

4. The station yard contains 2 running lines, the main or through line and the loop or platform line. At the Jhansi end of the loop line a short dead end of 138′ takes off the loop line and is used for stabling wagons and held 3 wagons at the time of the accident.

5. Signals are not interlocked with the points and consist of a home signal at each facing points and an outer signal for each direction. The signal levers are all four grouped on the Station Platform. Points are all fitted with bolts and cotters and are locked by padlocks. Wagons in the siding are held by a substantial scotch-block made of a double-headed rail thrown over the running rail and padlocked. All 3 points are fitted with Disc indicators, indicating the direction for which the points are set. All signals are clearly visible from the Station and to approaching trains. The weather was clear but it was fully dark at 19-50 when the accident occurred.

6. The engine crew of 3 persons and an extra fireman on the engine learning the road were all slightly injured.

Damage to Permanent-Way and Rolling Stock.

7. Damage is estimated as Rs. 2,454.

	Rs.
Permanent-Way	235
Locomotive	194
Rolling Stock	2,024
Total ..	2,454

The Evidence.

8. There is no question of the train entering Chitrakot against signals nor is there any doubt how the accident was caused, the train running through on

the Loop or Platform Line, picked up ' line clear ' opposite the station office and instead of taking the turn-out at points No. 2 back on to the main line, found these points set for the dead end and ran into it. Therefore, there remains only the question of fixing responsibility as regards the run-through of the train on the loop line with points No. 2 set incorrectly.

9. Points No. 2 were last used for shunting done under Assistant Mucadam Gayaprasad on W. Down Goods train, and it is interesting to note from the evidence of Station Master Bhagwandas that the shunting was done with the train outside points No. 1 and that, after shunting was finished, the train drew into the station on the platform line ensuring that points No. 2 were correctly set for this movement from loop to main line, and he might have assumed they were still so set correctly for S. 30 Up.

10. Station Master Bhagwandas further admits that :—

(*i*) After the departure of W. Down at 17.09 he did not take back from Gayaprasad, the keys of points No. 2 and the Scotch Block.

(*ii*) 1½ hours after departure of W. Down Bhagwandas orders certain shunting in the siding necessitating the issue to Gayaprasad of keys for points No. 2 and the Scotch Block. Again he does not raise the question of these keys or take them back after the shunting.

(*iii*) Again 1 hour later he gives Line clear for S. 30 Up Goods and orders Gayaprasad to run the train through on the loop line, necessitating the issue of key of points No. 2 and the retention and locking up in his key box of the key of scotch block. Again he does neither.

11. All the evidence admits that the main line was unoccupied and was available for S. 30 Up to run-through on it.

Chitrakot Station is worked under special Station Working Orders issued on 18th August 1930. Some of these orders relevant to the case are :—

ORDER No. V.—*Run-through trains.*

(*a*) A train may be allowed to run-through the Station without stopping *only on the main line.*

(*b*) *If the Main Line is occupied* a non-stopping train may be passed *via* the Loop Line, but it *must be brought to a stand* on the Loop Line when the " Authority to Proceed " (Line Clear) is to be handed over to the Driver.

ORDER No. X.—(*b*). The normal position of points is as under :—

Points No. 2 set for the dead-end siding.

The Scotch Block in the raised position (across the line).

(*c*) The Station Master on duty will be responsible for seeing that the points and the Scotch Block are kept locked in their normal positions and for keeping their keys under lock and key in the case provided for the purpose and retaining the keys in his possession except when required for the reception and despatch of a train or shunting operations.

ORDER No. XII.—(*b*). The Station Master on duty shall also be responsible that the General Working of the Station is carried out in strict accordance with the rules for the time being in force.

Finally, General Rule 37 and Subsidiary Rules 37 (*c*) and (*d*) require that all points should be locked and pointsmen should exchange all right signals with the Station Master before the latter lowers signals for a train. The all right signal is a white Signal light by night waved by the pointsman.

12. Gayaprasad says he was lighting the Signal lamps and as it was his duty to do this and he would be doing this at about the time of the accident, I believe his statement. The Station Master says Gayaprasad was at points No. 2 and gave the Station Master a green signal and quotes the Guard as bearing witness to the fact that Gayaprasad was at the points after the accident. Quite apart from the fact that the Station Master had no business to accept a

green signal from the pointsman as the proper signal was a white one, the Guard says there was no one at points No. 2 when he got there first nor even later when he went with the Station Master.

13. Mukat Behari, Head Muccadam, says he was at points No. 3 at the time of the accident. The Station Master says the man was at the station handing up the line clear and other evidence shows that the man had gone off to look for a lost buffaloe. Any way, if he were present he should have had the orders from the Station Master about the train and seen to the points, but the Station Master says :—

(*i*) He gave orders to Gayaprasad about the train.

(*ii*) He gave orders to Mukat Behari to hand the Line Clear to the Driver.

14. The Driver's evidence is almost wholly false, as regards his speed, the visibility due to his head-light and what he saw and heard.

Conclusions.

15. My conclusions are that the Station Master is wholly responsible for the accident. If there were any omissions and confusions in working on the part of the pointsmen these were the direct results of the Station Master not acting up to Special Station Rule No. XII.

16. (*i*) The Station Master against Rule V ran the train through on the Loop Line when the Main Line was available. If the train had gone through on the Main Line there would have been no accident or at the worst a trailed points, so the breaking of this one rule alone may be accepted as leading directly to the accident.

(*ii*) The train was not stopped in the station on the Loop Line to receive the Line clear under Rule V (*b*). The Station Master in his evidence is insistent that the train should have been, but was not stopped at the Up Outer Signal and the Officers holding the Enquiry in paragraph 7 (*i*) (*d*) of their " Remarks and Reasons " also blame the Station Master for not stopping the train at the Up Outer Signal " as per the Station Working Orders ". But the Station Working Orders say the train should stop on the Loop Line. The Station Master and Officers are equally ignorant of the Station Working Order. Had the train been stopped at the Station according to orders, the accident probably would not have occurred and certainly the damage would have been extremely light with the driver starting his train from a stand right up against Points No. 2.

(*iii*) The train was admitted and run through the Station by the Station Master completely ignorant of the whereabouts of points and scotch block keys. He hadn't seen these for some hours at least.

(*iv*) The Station Master before he lowered signals for the train to run through the Loop Line should have been doubly careful about the dead-end points, as by rule they are normally locked open for the dead-end as they were for this train. Instead of this he accepts one green light from Points No. 2 as an all-correct signal. He should have known, but he didn't, that he ought to have seen 2 signals, green from the Disc indicator and white from the pointsman, and until he had these two signals he should not have lowered his signals for the train.

(*v*) The Scotch Block key was not in the Station Master's possession and should have been before he lowered the Signal for the train.

17. I am of opinion too that as the Station Master was responsible for the accident, the Driver was certainly responsible for the damage. Had he taken Points No. 2 at 10 miles per hour instead of at about 25 miles per hour, to judge by the damage done, this damage would have been very slight indeed.

4. GREAT INDIAN PENINSULA RAILWAY.

Accident to No. 49 Up Grade Trunk Express at Ghoradongri station on Itarsi-Nagpur section, on the 29th June 1935.

LETTER FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, No. 1072, DATED THE 9TH JULY 1935. (6284-T.)

On the 5th July I travelled by 49 Up from Nagpur to Itarsi to see if with the restrictions of speed on the section it was necessary for the driver to infringe these restrictions especially the one of 10 miles per hour over non-interlocked points to enable him to keep time with his train. A very careful series of observations and stop watch timings over the whole section showed very clearly that even with coming down to 5 miles per hour at the facing points the speed of the train to keep time need never exceed 45 miles per hour even over sections where 60 miles per hour was permitted.

Description of the Accident.

2. On the 29th June 1935, No. 49 Up Grand Trunk Express, Madras to Delhi, was running through Ghoradongri Station on the Nagpur-Itarsi Section of the G. I. P. Railway. After passing the facing points and picking up line clear at these points to run through, the train instead of continuing on the main line took the turnout to a short Goods Loop, where one 4-wheeler wagon and one bogie goods wagon, both empty, were standing same 200 ft. apart. The Express trailed the trap-switch, struck the 4-wheeler wagon, carried this forward and with it struck the bogie wagon. The bogie was carried forward into the next trap switch and derailed of its leading bogies. The 4-wheeler wagon was flung to one side of the track at an angle of 45° and across a culvert of 2 spans of 6 ft. arches.

3. The engine came to a stand with its front buffers on the abutment of the culvert with both engine and tender wheels derailed. The engine was lying parallel to the track with one side on the bank and the other on the slope of the bank and so was leaning over at an angle.

4. The two leading vehicles of the Express were two 4-wheeler fruit vans. The leading van No. E.L.-1723 was thrown away from the track at right angles to it and came to rest on its side mounted on top of the 2nd fruit van No. 1643 which itself was lying at an angle of 45° to the track. The luggage vans were followed by the bogie stock of the regular train rake. The first car was a combined 3rd class and Buffet car No. 4695 which was derailed as was also the next bogie No. 5418 a combined luggage and brake-van. The remaining 7 bogies of the train were left standing on the rails.

5. The 4-wheeler goods wagon and the two fruit vans were damaged very badly, while the engine was damaged less severely and the 3 derailed bogies slightly.

6. Five persons were injured slightly. This number was made up by 2 engine crew, manager and one waiter of the Buffet car and one Railway Police Constable No. 278 in the leading 3rd class.

7. The Permanent-way was torn up for some 200 ft. and the rail tables showed clearly the marks of skidding indicative of the sharp and full application of the brakes by the Driver soon after he entered the goods loop and probably just as he struck the first wagon. The rod connecting the trap switch to its lever was broken indicating the trap as being open and locked open and being trailed.

Site of the Accident.

8. The station of Ghoradongri is non-interlocked, but has complete isolation of the main or run-through line. All points are clamped and padlocked and the signals for each direction are a home signal at the facing points worked from the platform and an outer signal worked from the facing points. There are no point indicators. The Goods Loop in which the accident occurred is a short loop of 430 ft. between traps on low bank with an arched culvert 2 × 6 ft. near the platform end.

9. Trains are worked on Neale's Token Instruments with Control Telephones and Revised Special Station Working Rules were issued in April 1935. The Accident occurred by daylight just after 15 hours. The weather was cloudy but clear and no rain was falling and visibility was good. Signals are clearly visible from the station and to approaching trains.

The Evidence.

10. It is admitted by all concerned that it was intended that the Express should run through the station. All signals were lowered, the facing points were clamped, locked and manned by Hans Raj Pointsman, and the Neale's Token was sent to the facing points for a run-through and duly delivered to the Driver. It is also admitted and found that facing points No. 5 leading from the main line to the goods loop were set incorrectly for this loop and not for the main line. These points were not locked and the lock and its key were lying at the points. The accident was therefore caused by the incorrect setting of points No. 5. There remains only to fix responsibility for the incorrect setting of these points.

11. The last train through Ghoradongri station was No. 111 Down Goods train which left at 14.15 hours. This train did some shunting in the goods loop under Salamat Khan Pointsman. This man was on duty at points No. 5 and the trap ; and when he had finished the work in the siding it was his duty to lock back the trap open, set points No. 5 for the main line, lock them and return the keys to the Station Master. He admits he left points No. 5 incorrectly set and the lock and key lying on the ground near them, but told Sukh Ram another pointsman to see to points No. 5. Sukh Ram denies this and in any case it was Salamat Khan's duty to do it and after the departure of No. 111 Down he still had 45 minutes before arrival of the Express in which to do it but he went to the bazaar instead.

12. The Special Working Orders require :—

(*i*) Under Rule XI (*a*). " The Station Master on duty must personally set and lock or superintend the setting and locking of points for the reception and despatch of all trains carrying passengers including ballast trains."

(*ii*) Under Rule XI (*b*). " The normal position of points No. 5 is for the main line," and

(*iii*) Under Rule XI (*c*). " The Station Master on duty will be held responsible for seeing that the points and derailing switches are kept set and locked for their normal positions and their keys kept under lock and key in the case provided for the purpose except when required for the movements of trains or for shunting purposes."

13. The Station Master has stated that after giving line clear for No. 49 Up when he went to see to the locking of the points as required under Rule XI (*a*) he was taken ill very suddenly and was unable to get out to the points and see to their correct setting, he also says he forgot all about the keys of points No. 5 and that they should have been in his possession. He also said that whenever he did go out to the points he went out without the keys.

Conclusions.

14. I consider the accident the direct result of extremely lax and confused working at this station. The principal impression I carried away from my enquiry was that the menial staff were not allocated to specific duties during fixed hours but the nearest man present could be told to do any job on an order from the Station Master. The way the staff were employed to deal with No. 111 Down and then No. 49 Up gave me this impression.

15. As regards responsibility for the accident I consider Station Master, Kunji Lal Tewari, principally to blame. He did not take action under Station Working Order No. XI (*a*) and see all facing points set and locked. He pleads sudden illness which, if accepted, may exonerate him from not examining the points himself but this plea cannot be extended to cover the breaking of Rule XI (*c*). No matter how ill he was he should have had the key of points No. 5 in his possession under this rule and that as soon as the shunting on No. 111

Down Goods was finished or about 45 minutes before he himself claims to have been struck down by this sudden illness. It was this abnormal setting of points No. 5 that caused the accident.

Further, I consider that if he were ill himself and unable to go to the points he should have been most careful and complete in the instructions he was giving the porters he was trusting instead of asking them at the station if the points were correctly set and accepting their assurances that all was well when Hans Raj had not even been out to the points and Salamat Khan who was last given the key of points No. 5 had not returned them.

16. To a less degree I hold :—

(*i*) Pointsman Hans Raj responsible for not seeing that points No. 5 were correctly set when he went out to points No. 6 and passed by points No. 5. He failed to comply with General Rule No. 48.

(*ii*) Pointsman Salamat Khan for not setting and locking points No. 5 after finishing the shunting on No. 111 Down Goods and returning the keys to the Station Master. He left the trap correctly locked and according to his own statement was too lazy to go another 200 ft. to do the same to points No. 5 but called out to somebody else to do it.

The actions of these two men are indicative of the slack working of the station menial staff.

17. Finally, I consider, little and in fact no damage would have resulted had the driver taken the non-interlocked facing points at his maximum permissible speed of 10 miles per hour. He is therefore responsible for practically the whole of the damage resulting from the accident. He had no excuse whatever for exceeding the speed limit because :—

(*i*) He was running 5 minutes ahead of his booked time.

(*ii*) The Time Table makes ample allowance for the reduced speed of 10 miles per hour over facing points as very conclusively proved by my observations of 5th July with this very train.

Remarks.

18. I consider that in the interests of safety, the present non-interlocked stations on the Wardha-Balharshah and Itarsi-Nagpur Sections of the G. I. P. Railway should be wholly or at least partially interlocked. If funds are not available for the full locking of all stations according to G. I. P. Railway Standards, then at least one of the cheapest forms of the simplest key locking should be provided at least at the stations where passenger express trains run through daily.

L192RB—440—11-2-35—GIPS

PRB—RA/19

RAILWAY ACCIDENTS

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 31st March 1936

No. 19

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1. BENGAL AND NORTH WESTERN RAILWAY.

No. 509 Up Goods train crashing through the bufferstop and the station building at Sagauli Station on the 1st February 1936.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 505/XIII/36, DATED THE 16TH MARCH 1936. (6527-T.)

Description of Accident.

At about 2-35 hrs. in the morning of Saturday, 1st February 1936, No. 509 Up Goods coming from Raxaul entered Sagauli station at too high a speed to be able to stop at the buffer dead end of the dock siding into which it was admitted and crashed through into the station building.

2. The locomotive was No. 108-F class and the train consisted of 27 vehicles, fully loaded with sugar-cane, and a brake van. The total weight being approximately 270 tons. This is a small train and the engine a light one.

The engine ploughed its way through the upper class waiting room, parcel office, waiting hall and booking office. It stopped after having penetrated a distance of 54′ into the building.

3. Four intending passengers were killed in the waiting hall and the Assistant Station Master on duty in the booking office was killed. There were no seriously injured. The engine crew escaped unhurt, the telegraph clerk received slight injuries. Prompt medical attention was given by the local Assistant Surgeon. There was very little damage done to the engine and none to the vehicles of the train, none of which were derailed except those that overran the bufferstop.

Description of the locality of the accident.

4. Sagauli is a junction station on the Muzaffarpur-Narkatiaganj line. The junction line being the branch from Raxaul which comes in almost at right angles from the north and enters Sagauli with a long curve at the east end of the station. The tangent point being almost at the home signal. The length of the curve is approximately half a mile and the outer signal is fixed at a point within a distance of 1910 ft. from the home signal. The degree of curvature is $3\frac{1}{2}°$. The gradient is a fall of 1 in 400 for 3,000 ft. almost up to the home signal. The curve is entirely on this grade.

5. All trains from the branch line are received into the dock siding which has two lines Nos. 1 and 2 terminating 10′ short of the station building. There is a cross-over from No. 1 to No. 2 at the extreme end, the bufferstops are very light bent rail structures with a wooden cross beam. The train being admitted onto No. 1 line and passing over on to No. 2 met very little resistance in the outer wall and partition walls of the station building. In each case these were met broadside on and collapsed immediately in turn. The distance from the home signal to the buffer stop is 1534′. The distance from home to outer is 1910′.

Evidence and Conclusions.

6. The only persons in a position really to explain what happened and the reason for the accident are the engine crew. Of these the fireman and Khalasi profess ignorance of almost everything. The driver makes several conflicting statements instead of adhering to a straightforward account which would clear up the matter. His first statement to the police is that the outer signal was at danger, his second at the enquiry that it was lowered and finally on the second day of the enquiry he states that he thought his train had parted and that he ran ahead. What seems most probable therefore is that having made an error he lost his head, seems to have only a confused idea of what did happen and is now himself looking for an explanation and an evenue of escape. It remains therefore to extract an acceptable reason from the meterial facts to be obtained from the evidence and inspection.

7. The train was a light one with a small engine. It left Ramgarhwa at 2-00 hrs. and was booked 58 minutes over a run of $9\frac{1}{2}$ miles, *i.e.*, an allowance of about 10 miles per hour. From the evidence of the Police who were awake at Sagauli, the crash occurred before 2-35 hrs. and it may be accepted that the run was completed at an average speed of 18 miles per hour. This is not in itself excessive but was unnecessary. The maximum speed was probably much higher

about 20—22 miles per hour. From the damage done it would appear that the train struck the station building at a speed of 10 to 15 miles per hour. It is certain therefore that the driver did not apply his brakes as he states before reaching the outer signal, a distance of over 3300 feet from the bufferstop. Had he done so there could have been no accident.

8. From an examination of the engine—flats are found on all wheels—the result of sudden and severe application of the brakes. The brakes are in good order but there is no sanding gear. He must therefore have applied his brakes long after passing the outer and probably somewhere in the region of the home signal. This, combined with the driver's conflicting statements made at different times that the outer signal was at danger and that it was lowered, makes it more than a suspicion that he never saw the outer signal at all.

9. There is no suggestion that the signal lamps were not lit. A night examination of the signals at the enquiry however brings to light further significant features. Owing to the sharp curve it is impossible to see the back light of the outer signal from the station or even from the points from where it is lowered. The home signal light is not visible from the outer signal and even in day light it is not possible to see the home signal before reaching the outer, owing to a belt of trees. This entirely refutes the driver's statement that he saw the lights of the outer and home signals at the same time. Furthermore examination shewed that the outer signal light was not visible from the driver's position at a distance of more than two telegraph posts, about 620′, from the signal and only very faintly then. The actual point of focus being at about one T. P. length about 300′. This was due to the signal being on a curve and being focussed tangentially instead of correctly onto a point about $\frac{1}{2}$ mile, say 3000 ft., down the track whence an approaching driver would be given a fair and reasonable veiw. Had the signal been at danger no driver could have stopped within the distance after getting his first view of the light. Similarly with the home signal, this was focussed on a point about one T. P., *i.e.*, 300 ft. distant and invisible until more than 2/3 of the distance from the outer signal had been passed. The lenses of the spectacles were very dirty and this further affected visibility. Owing to faulty fittings it cannot be certain that the lamp was correctly placed in the bracket.

10. Considering these facts, with a correct focussing of 3000 ft. and a speed of 10 miles per hour an approaching driver would first sight his outer signal and have it in view for a period of about $3\frac{1}{3}$ minutes before reaching the post. At twice that speed, which it may be assumed that the train in question was travelling, the driver should have had the light of the signal offered to him $1\frac{2}{3}$ minutes before reaching it, giving him ample time to have his train in hand. On reaching the outer post he should at once have picked up his home signal light. With these two signals focussed as they were and the train travelling 20 miles per hour the conditions were very faulty. Focussed at 300′, and only dimly visible by peering at 600′, the driver would have had the light presented to his range of vision for about 15 seconds only, a vast difference from the $1\frac{1}{3}$ minutes to which he was entitled. Similarly with the home signal. If the driver had missed the outer he would sight the home only 10 seconds —20 seconds before being onto it. Owing to the sharpness of the curve the engine head-lights would be of little use in picking up the signals.

11. It has been stated in evidence that the driver was intoxicated. This is very much open to doubt. He had been some hours on duty, had taken over his engine after careful examination, had performed the shunting operations *en route* perfectly satisfactorily. There was no liquor on his person nor found on his engine, if suspected this should have been sought for. There is little to be surprised at if he was shattered and incoherent immediately after the smash. This was the first time the driver had driven this engine, he had only been on the run for one week. He had a light load and let himself out much faster than was necessary. He should however have realised that by travelling at a higher speed he must expect to cover the section so much the more quickly and be all the more on the alert to pick up his signals. It is here that he failed. Owing to this and the fact that he was given the shortest possible range of vision of the signal light it is certain that he missed the outer signal entirely and was onto the home before he knew it.

12. I therefore agree with the finding of the enquiry by Heads of Departments that " the Driver through a lack of alertness failed to regard the outer signal and was too close to the points before he applied his brake and thus entered the station yard at a speed that made it impossible to avoid the accident ", but I consider that had the setting of the signals been correct his error might have been compensated.

2. EAST INDIAN RAILWAY.

A pilot engine with eight empties and one loaded wagon running into a motor bus at level crossing No. 20-B on the Giridih Colliery Section on the 8th February 1936.

FROM MR. H. A. JOSCELYNE, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 416/XIII/36, DATED THE 28TH FEBRUARY 1936. (6511-T.)

Description of the accident.

At 4-30 hours of 8th February 1936 'A' Pilot engine No. 1208 was pushing a load of 8 empties and one loaded wagon from Domohani to Kalimoran siding—Brake van with gunner and shunter being in rear of engine. As the leading vehicle No. B. N. R. 10688 passed over level crossing No. 20-B on the Dumri Giridih Road it collided with a private motor bus No. SLI.217 which was travelling from South to North, having come from Pareshnath. The fore end of the motor bus evidently was actually across the track at the moment of impact. The first truck rode completely over the bonnet of the bus with both its leading and trailing wheels, the bus becoming jammed between the first and second trucks below the buffers. The first two trucks were derailed of all wheels and the third truck of its leading wheels only. The whole travelled a distance of 72′ after the impact, the leading truck stopping with its off wheels in the side drain. The speed of the pilot was probably 3-4 miles per hour and that of the bus 10—15 miles per hour.

2. The motor bus was carrying 31 people of which three were drivers, the rest being pilgrims. Four of the occupants were killed instantaneously and 15 were injured more or less seriously. The bus was a private vehicle and belonged to Sigli State near Kolhapur in Bombay Presidency. It was said to be one of four buses conveying Jain pilgrims from Pareshnath to Bhagalpur *via* Giridih where the collision occurred.

The night was dark and drizzling and visbility was bad.

3. First to arrive on the scene of accident within an hour was the Assistant Surgeon who with Sub-Assistant Surgeon and dressers rendered first-aid to the injured. These were removed to the Civil Hospital at Giridih.

Relief train from Madhupur arrived at 11-30 hours and the Divisional Officers by road from Asansol at about 12-30 hours.

Descritption of site of accident.

4. The Dumri-Giridih road is a main metalled highway and perfectly straight for a considerable distance on the side from which the motor bus was approaching the level crossing which is a right angle crossing. There are trees on either side of it but not a continuous avenue. Level crossing and road are practically at ground level. Warning crosses are erected at the roadside 208′ from the crossing.

5. The coalfield siding is broad gauge and somewhat tortuous. The approach side from which the pilot was working is on an 8° curve and not one such as would obstruct the view but in this case, in which the engine was pushing the load, rather the reverse. The grade was uphill 1 in 100.

6. The crossing itself is B class and as such should have a minimum of one gateman. It is fitted with iron swing gates which can be closed across the road and also with side wickets for foot traffic. The surface of the crossing was not bad but the gates and fittings were in miserable condition not having been painted for a very long time. The roof of the gate lodge had fallen in and the building was uninhabitable. There were no brackets or means of erecting lamps at the gates.

Conclusions.

7. From the evidence it is quite clear what had happened. The level crossing though B class was unmanned. There was no sign of any gateman and it cannot be accepted that there was one appointed to this gate. I cannot consider seriously the evidence of the Colliery Management that the man Dhunoo Miah was the gateman. The man himself denies it and it is impossible for one man to be in charge

of two level crossings 100 yards or more apart and yet be held responsible for an accident at either of them.

8. There were three drivers on the motor bus as it was on a long distance tour. The man Bandhu who was driving was among the injured, one of the other two was killed. From the evidence of the surviving drivers it is seen that they thought the road to be all clear and there is no suspicion of any attempt to dodge in front of an approaching train. There is no reason to disbelieve the speed of the bus being as stated *i.e.*, 10—15 miles per hour. It is impossible to prove how many lights and what lights were showing on the bus as both head and side lights are completely smashed up and all connections, fittings, etc., salvable have been removed. Visibility was not good and the few mango trees close to the crossing would certainly obscure considerably a view of the track on a dark night. Even if the engine were whistling it is possible that this would be eclipsed by the rattle and noise of the bus. It is a moot point as to how much responsibility still rests with the driver of a car for seeing that a railway track is clear to each side before crossing it when he finds the gates wide open and every invitation to proceed.

9. The engine had 9 trucks in front of it, *i.e.*, the leading buffers were over 200 feet ahead of the driver and still further ahead of the gunner in the brake van behind the engine. Had this railway staff been keeping a keen look-out they should have seen any lights of vehicles on the road-way. They all with one exception state that they were looking out on the north side, the side opposite to the approach of the bus, the exception, the fireman, was looking out on the left hand side and states that he saw nothing on the road. This is the only evidence there is against there having been any strong lights on the motor bus.

10. The leading truck was absolutely unprotected by lights and it would be impossible at such a distance for any of the shunting staff, either in the engine or brake van, to see the exact moment at which the truck passed on to the crossing. Even if the driver of the bus had seen the engine he would probably have expected the train to be in rear of it. Unless looking closely he would be unlikely to see the unprotected vehicles being pushed onto the crossing.

11. The operation as performed by the pilot was a perfectly normal one and is carried out daily on all colliery sidings. It is, I consider, most unsafe where unmanned level crossings have to be passed.

Recommendations.

12. (1) That rules for shunting be revised and it be rigidly laid down that no vehicles may be pushed ahead of an engine without adequate protection in the form of lights either fixed on the vehicle or carried by hand.

(2) In view of the fact that the Colliery Department does not consist of professional railway men and from the way these crossings have been maintained it is clear that they are not the proper authority to be in charge. That the whole of the Colliery sidings with level crossings, etc,. should be handed over to and maintained by the Engineering Department of the Railway.

3. BURMA RAILWAYS.

No. 4 Down Mail running into a motor car at mile 6624 between Kadok and Pyinbongyi on the Mandalay-Rangoon main line on the 8th March 1936.

FROM MR. A. G. HALL, M.B.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2-A., RANGOON, LETTER NO. 571/A., DATED THE 30TH MARCH 1936. (6552-T.)

Description of the Accident.

On the 8th of March 1936 at 5-20 hours, No. 4 Down Mail was travelling right time at normal speed between Kadok (Mile 71) and Pyinbongyi (Mile 64¾). On approaching the Grand Trunk Road Level Crossing at mile 66/24, the Driver of the train observed a Motor Car on the Level Crossing and was unable to avoid a collision. The cattle fender of the Engine, YC.161, hit the Motor Car on the right hand side of the bonnet, slewed it round and carried it about 70 feet on the left hand side of the down track, where it was eventually thrown clear near a tree on the side of the road. The two passengers in the Motor Car, U Nyun, M.L.C. and U Sein Win, M.L.C., were thrown out of the car and injured. The Driver of the car Mg Ngwe Ya was seriously injured and subsequently expired in hospital at Pegu at 23-30 hours on the 10th March 1936. The car was a total wreck and the two passengers had a miraculous escape. The cattle fender of the engine was damaged, the cost of repairs being estimated at Rs. 35. There was no damage to the track but about 60 feet of fencing was uprooted by the dragged car and the cost of repairs was about Rs. 5.

2. At the locality of the accident the Railway line is level for nearly 2 miles to the south and for half a mile to the north, after which there is a short falling grade of 1 in 1500, a short rise of 1 in 800 and another three quarters of a mile level. To the south, the line is straight for a mile and a half and to the north for a considerable number of miles. The Grand Trunk Road runs parallel to the Railway north and south, and close to it, the crossing being effected by very sharp right angle bends. At both north and south directions warning and whistle boards have been provided by the road authorities and Railway respectively. The Level Crossing is of 'A' Class and has two 12-foot single gate leaves fitted with lamps which show red to the road when the gates are closed and show amber to the road when open. The gates are not rod-coupled. The visibility of the road to the railway and the railway to the road is good in both directions. There is vegetation on one side of the line but not sufficient to interfere with the visibility. The density of traffic over the crossing may be judged by the following figures obtained as the result of a short census.

Rangoon-Mandalay direction	by night	15 cars, 21 carts.
	by day	33 cars, 28 carts.
Mandalay-Rangoon direction	by night	20 cars, 43 carts.
	by day	30 cars, 37 carts.

3. The two injured passengers in the car received first-aid assistance from the Driver and Guard of the train. The Motor Car Driver was very badly injured and never regained consciousness. First-aid was not administered to him as the staff concerned did not feel competent to deal with the man in such a serious condition. Messages were sent down the line at Pyinbongyi to Pegu where the Sub-Assistant Surgeon was ready on the arrival of the train to deal with the injured. The driver was taken into Pegu Civil Hospital and the two others were allowed to proceed to Rangoon where they were attended to in the Rangoon General Hospital.

Statement of evidence taken.

4. There is no doubt that there was a fog at the time of the accident, though the evidence regarding the degree of the fog is not by any means unanimous. The evidence of the most important witness Maung San Nyun has never varied appreciably since the first preliminary statement was taken. He frankly admits that he slept while on duty with the gates only secured by their bolts. He further admits that he found the gates open when the noise of the accident awakened him. Further evidence regarding the position of the Level Crossing gates at the time of the accident is somewhat conflicting but the concensus of such evidence goes to show that both the gates were open at the time. It is unfortunate that the most important witness from the point of view of the accident to the car has died and was never in a position to give his statement.

5. The two passengers in the car U Sein Win and U Nyun state that they were awake between Pegu and the site of the accident, the former is positive that the

East gate was open, but neither can give any other useful information relative to the accident and deny any knowledge of the approach of the train, even at close range. U Sein Win states that the speed of the car was not less than 20 miles per hour over the Level Crossing : in my opinion this, owing to the sharp curvature of the approach to the crossing, would be impossible in day time, and still more so at dawn with conditions of fog prevailing.

6. The evidence of the Driver of the train was straightforward except that he went back on his first assertion that both Level Crossing gates were open at the time of the accident. It is quite possible that under the stress of an impending accident he would not accurately observe the condition of the gates. His statement that he whistled at the board is borne out by the 1st and 2nd Firemen and Guard. The occupants of the car heard no whistle, which agrees with their contention that they knew nothing of the approach of the train. No evidence has been produced to disprove that the driver whistled.

7. Guard H. Thornton was not a good witness, but he appeared to be honest, as is borne out by his frank admission of not having protected his train. His statement that he specially noted that both Level Crossing gates were open immediately after the accident may be accepted as correct.

Conclusions.

8. In view of the frank admission by the Gatekeeper on duty, Maung San Nyun, that he was asleep outside the gate hut, at the time of the approach of No. 4 Down Mail and that consequently the gates were not securely fastened until the train had passed as laid down in General Rule 229(*c*), he must be held primarily responsible for the accident. It is understood that he has up to date been a reliable man, he was passed as competent by the Permanent Way Inspector and has satisfied the requisite eyesight test.

The evidence proves that the gates were open immediately after the accident and there is little doubt that they were also open prior to the arrival of No. 4 Down. It is probable that the gatekeeper shut them when he left for his hut the last time and that the driver of some vehicle opened them subsequently and failed to close them.

9. It is impossible to say exactly how the accident occurred. The fog prevailing at the time would make the detection of an approaching train at a distance difficult, both from the point of view of sight and hearing. At the same time the approach to the Level Crossing is directly in face of an approaching train and it is difficult to understand how it was that the driver of the car received no intimation whatsoever of the approach of the train. Unfortunately no evidence can be produced relative to the position of the gear level of the car immediately after the accident and it is impossible in the face of conflicting evidence to say whether the car was stationary on the crossing or not.

I do not hold the driver of the train in any way responsible for the accident.

The arrangements for medical attention to the injured were satisfactory.

Recommendations.

10. The primary cause of the accident was a failure of the human element. It is therefore necessary to consider whether some form of safety appliance is required to guard against the results of such lapses on the part of the gatemen in future.

For the crossing in question, I do not consider that any special protection devices are required for the following reasons :—

(1) The visibility of road to railway and *vice versa* is good in both directions.

(2) The accident was certainly due in large measure to the presence of fog, *i.e.*, an abnormal condition.

(3) The cases of accidents caused by complete failure on the part of gatemen are rare.

(4) The configuration of the road at the crossing makes slow travelling essential.

Regarding item (4) above, while the sharp bends make for a breach of speed for motor vehicles, this is perhaps rather overdone at the crossing in question, and an easing of the curves with possibly wider gates, would make for greater safety.

It is understood that in the course of inspections any cases of level crossing gates being open during the passage of trains are brought to light, the offenders being suitably dealt with. If accidents are to be avoided the necessity for such inspections, some at night, cannot be over-emphasized.

4. BENGAL NAGPUR RAILWAY.

Accident to No. 144 Up Passenger train between Samnapur and Charegaon on the 24th March 1936.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 848/XIII/36, DATED THE 28TH APRIL 1936. (6576-T.)

Description of the Accident.

On the 24th March 1936, No. 144 Up Passenger left Samnapur, a station at mile 658 on the 2′-6″ gauge Gondia-Jubbulpore Branch, at 15-39 hours, right time. The train consisted of C. S. class engine (4—6—2) No. 00116, eight coaches and L. A. S. wagon. Two third class bogie coaches were leading followed by two first and second class composite bogie coaches, an inter class bogie coach, two more third class coaches and the brake van with Las wagon No. 00262 in rear. This is a normal composition for this train.

2. The train travelling at the normal average speed of 25 m.p.h. reached the approach to the Nahara Nullah bridge at mile 664/8 a minute or two before 16 hours. On nearing the bridge the driver noticed something wrong with the track and at once applied his brakes, very severely. He was, however, too late in his effort to stop the train and the engine left the rails on the left hand side a few feet short of the bridge, it crashed into the left side of the abutment capping and plunged into the Nullah below retaining a vertical position. The tender started to follow the engine but, as it derailed and dipped, the coupling broke thus allowing it to slew at right angles to the track as it was pushed forward by the leading coaches, which, though derailing, followed the alignment on to the first span of the bridge. The tender was thus propelled sideways along the first span until it dropped off hitting the capping of the first pier and falling end for end in front of the engine standing in the Nullah 25′ below. The first and second coaches at the same time capsized sideways on to the engine below while the third coach capsized on the bank.

3. The driver and fireman both succumbed to their injuries. The former was able to make a dying statement. The engine Khalasi received slight injuries. Of the passengers it is surprising that none were killed. Fourteen were injured and only two seriously. One individual was pinned in the wreckage for over two hours before he could be released. First-aid was administered by the train staff and the seriously injured were subsequently sent to hospital.

4. Damage to rolling stock was considerable and is estimated as under :—

Engine	Rs. 18,000
Three bogie coaches	Rs. 28,000
Track	Rs. 1,000

Description of site of accident.

5. The Nahara Nullah is at the bottom of a depression approached by fairly steep grades from either side. The bridge itself consists of 4 spans of 40′ and 6 spans of 60′. The bed level at centre is over 40′ below rail level. The sides are sloping and not precipitous. On the south side, the direction from which the train, 144 Up Passenger, was approaching, the approach to the bridge is a sharp left curve of $3\frac{1}{2}°$ the terminating tangent point of which is 55′ only from the face of the bridge abutment. This curve is over 1500′ in length, the first 1100 feet is in a cutting and on a falling grade of 1 in 400. The last portion of nearly 400′ is on embankment and running level from the cutting to the bridge abutment.

6. The track is 2′-6″ gauge and consists of 41 lbs. rails 27′ in length laid on wooden sleepers, dog spiked, 11 sleepers to the rail. The line is considered fully ballasted. On an estimation, considering various sections, there is about 6 cft of ballast per ft. run. There are no creep anchors.

Evidence and Conclusion.

7. A careful examination of the track well up into the cutting, *i.e.*, for a distance of 200 to 250 yards shewed that the maintenance was by no means neglected. I have checked a large number of curves in various running tracks recently and the alignment of this curve compared very favourably with the majority. Levels and superelevation throughout were definitely good. One defect was in

gauge in which variation was excessive. Condition of sleepers was fair some 10% needing to be changed. Spikes were holding quite well. Creep was very slight varying from nil to 3". A sinister feature was the fact that when examined after the accident and at 16 hours all the joints were jammed hard up. The same joints examined early the next morning were open but insufficiently so.

8. At a distance of 480' from the bridge abutment the rails were severely skid marked having become blue hot evidently from a too severe application of brakes. An examination of the wheels of the vehicles of the train revealed flats, due to skidding, on the leading bogie wheels of the last vehicle No. 00262 and to a less extent on No. 00146 the 3rd vehicle from the rear.

9. The length of the train was 347' and the skid marks at 480' from the bridge being those of the leading bogie of the last vehicle, 26' from the rear, would indicate that the engine was distant from the bridge 480'—347'+26'=159' at the moment the driver destroyed vaccum. The train was travelling at most 30 m.p.h., *i.e.* 44 ft. per sec. Allowing for lag of a second or so the driver must have been 250' from the bridge when he first saw the defect in the track referred to in his evidence and in that of the Khalasi.

10. The track was in good alignment after the accident up to a distance of 155' from the bridge. From that point for a length of 71' it was thrown out up to a maximum of 17 inches. Of the remainder, up to the run off frame of the bridge, a length of 65' was literally ploughed up, pieces of rail even being carried by the engine to below the bridge. The track being thus destroyed and wheel marks on the rails being so profuse it was not possible to determine the exact point at which the engine left the rails. Had this been due to excessive speed the derailment would have been on the off side of the curve and not on the near side.

11. The cause of derailment must therefore be looked for in defective track. This might possibly have been due to tampering and deliberate wrecking but there is no evidence whatsoever to this effect. It is certain that the track was defective, both Khalasi and Driver gave evidence to this effect and this was the reason for the sudden application of the brakes.

12. There was very little creep of the rails which were held rigidly at the bridge and lateral distortion was not there possible. Being on such a sharp curve any distortion unless vertical or very excessive would not be visible to the driver of an approaching train until he was close up to it. This combined with the facts of a downhill grade thrusting towards the bridge, which would prevent travel or easement, and of insufficiency of expansion in the rail joints, leads to the conclusion that a buckle had occurred at the end of the curve and just short of the bridge. It may or may not have been a very severe buckle in itself and probably was not but its situation and the fact of its being restrained by the bridge accentuated its danger.

13. Added to this there is the sudden application of brakes by the driver thus throwing a tremendous jarr and strain onto the rails. This in itself is known to be sufficient to create a buckle in an already strained track. I therefore conclude that the derailment of the train was caused by a buckle in the track and its aggravation by a too sudden application of the brakes.

14. A careful scrutiny of the muster sheets and records of maintenance and inspection of this section indicates that all rules and regulations had been carried out and that ordinary care had been exercised. The length in question had received regular attention in the matter of minor packing and had twice been through packed within two months of the accident.

15. A buckle is unquestionably due to defective maintenance but I do not in this case hold any individual directly responsible. Responsibility must be shared generally by the maintenance staff. This is a tricky portion of the line to maintain and special care should be exercised by those in charge. There are several other sections similarly situated on this branch and the lesson should be learnt from this accident.

16. I recommend that special precaution in the matter of inspection be ordered for this and similar portions of the line and that steps be taken to improve the maintenance, creep anchors being provided if necessary.

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460.

Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 30th September 1936

No. 20

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M171RB

1. EAST INDIAN RAILWAY.

No. 47 Up Passenger train running into No. 167 up goods train at Warisaliganj on the 23rd May 1936.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 1229/XIII/36, DATED THE 30TH JUNE 1936 (6644-T.).

Description of the accident.

On 23rd May 1936, working Goods train No. 167 Up consisting of 29 wagons, a brake and two rest vans in rear was standing on the main line at Warisaliganj Station. The train had arrived at 21 hours and shunting had been completed before 21-30 hours. In the meantime Kashi Chak station had asked line clear for No. 47 Up Passenger following and the Station Master on duty decided to hold up the goods train and give precedence to the passenger train, passing the latter on the loop line. While the points were still set for the main line the passenger train arrived at about 21-42 hours and smashed into the rear of No. 167 Up Goods. Speed at the moment of impact is said to have been about 15 miles per hour.

2. The two rest vans in rear of the train were both lifted into the air and thrown sideways on to the station platform. The brake van was partially telescoped and the engine of the passenger train was derailed.

3. There were fortunately no fatalities. One of the goods train porters who was in a rest van received a number of injuries which, taken collectively, are described as serious. Four other railway staff and nine passengers received simple injuries. These all received first aid from the railway staff present. The engine of No. 167 Up was transferred to No. 47 Up and at 2-40 hours on 24th May the train proceeded to Gaya where further medical relief was administered.

4. Relief trains arrived from Jamalpur and Gaya at 4-25 hours and 4-38 hours respectively on 24th May. The track was cleared quickly and there was no serious dislocation of traffic.

5. Total cost of damage to stock and permanent-way is estimated at about Rs. 12,000.

Description of the site of accident.

6. Warisaliganj is a simple crossing station on a straight track. The main platform is on the through line and is of full height. The platform on the loop is rail level. The main platform is 1,000 feet in length, the station office being situated at 700 feet from the north end, the direction from which the two trains in question were approaching. The goods train was standing in front of the station on the main line and its brake van was 300 feet from the building, the rear of the two rest vans behind it being approximately 800 feet from and inside of the facing points. The home signal is 32 feet outside the points. The outer signal is on a flat curve of 8,895 feet radius the tangent point of which is 1008 feet from the home signal. There is no gradient.

7. The station is one where the system is that of points and signals being worked locally from ground frames situated in cabins near their respective points, with interlocked levers on the platform to control the lowering of approach signals from either direction. Disengagers being fitted the return of the control lever on the platform to normal throws all signals back to danger.

Conclusions.

8. I consider that the accident is due to the irregular working of Warisaliganj station and the negligence and disregard of rules by the Station Master on duty.

9. I consider the Station Master on duty at Kashi Chak responsible in that he did not transmit an out report of No. 47 Up immediately that train had left his station. Had he done so the accident would probably not have occurred.

10. There is no doubt that the accident was intensified by the speed at which No. 47 Up entered Warisaliganj station. Had the driver reduced to 25 m. p. h. at the facing points he would certainly have been able to pull up in time and the accident would have been one of " averted collision " only. Even at the high speed at which he was travelling I consider that he should have done better than he did. In the circumstances I cannot but hold the driver responsible for the severity of the accident.

2. BURMA RAILWAYS.

Derailment of No. 78 Down mixed train at mile 420/21 between Paukkan and Wetlet on the 1st June 1936.

FROM MR. A. G. HALL, M.B.E., GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2-A., RANGOON, LETTER No. 762/17-A., DATED 15TH JUNE 1936 (6677-T.).

Description of Accident.

No. 78 Down Mixed left Wetlet Station, right time, at 4·51 hours on the 1st June 1936. The train was fully vacuum braked, and was in all respects in normal running condition. There is little doubt that the weather conditions were bad at the time, and if heavy rain was not actually falling after the departure from Wetlet, it is certain that extremely intense rain had fallen previously. The train ran normally and probably to correct time until the immediate approach to the site of the accident at mile 420/21. There is a 6′-6″ girder bridge at this location and the bank to the north had been washed away to a depth of about 3 feet for a length of about 130 feet, which resulted in the derailment of the train. The engine passed over the bridge, demolishing a considerable portion of the masonry, capsised and came to rest, partly buried in the mud of the bank at a point 240 feet ahead of the breach, carrying one of the bridge girders with it.

2. The engine after the accident was lying on its left side on the slope of the bank, with its wheels at a higher level than the top of the boiler. The tender was somewhat similarly placed but at an angle to the engine. The regulator was found slightly open, but as this was comparatively free in its bearings, it may have been moved when extricating the first fireman. The brake was in the fully applied position, and the reversing gear in full forward and jammed in that position.

Bogie third and brake-van No. 7461 next to the engine was badly damaged at its rear and while bogie third class No. 4089, the second vehicle from the engine had been slewed round through more than a right angle, its former rear and telescoping through the mail compartment of bogie third with half mail compartment No. 6296 which was the third vehicle from the engine. The upper portion only of the latter was demolished, which was fortunate for a sorting clerk, who having fallen down, was only slightly injured.

3. The engine crew were extremely fortunate in escaping with their lives : the first fireman was badly injured and the driver injured, but not seriously. The second fireman received light injuries only. Ten persons were injured, the only really serious case was the Chaprassie of Assistant Engineer, Katha.

The total damage is estimated at Rs. 36,328 to rolling stock and Rs. 1,835 to permanent way.

Description of the Locality.

4. From Wetlet station at mile 428¼ the line runs straight and approximately level on a low bank for about 3¼ miles : this is followed by a steady rise of 3½ miles at an average gradient of 1 in 225 to the summit at mile 421½. From this point there is a steady fall for ¾ mile at 1 in 200 to the site of the accident, after which the line rises 29 feet in 2½ miles to Paukkan station at mile 418 by a series of up grades varying between 1 in 200 and 400, connected by a few short reverse grades. The site of the accident is therefore at the lowest point of a local depression in high ground, the Northerly crest being 18 feet and the Southerly 29 feet above formation level at mile 420/21. This local depression is a portion of a comparatively small catchment area, and the run off of rainfall is passed through the line by 3 openings as follows :—

Bridge No. 53 mile 421/8	.. ..	1·5′-0″ arched culvert near the summit of the Northerly crest.
Bridge No. 52 mile 420/21	.. ..	1·6′-6″ girder bridge at the bottom of the depression (the scene of the accident.)
Bridge No. 51 mile 420/10	.. ..	1·6′-6″ girder bridge about ½ mile south of bridge No. 52 and 5′-0″ higher.

The extremely local nature of the depression can be judged by the following formation levels :—

Ketka Station mile 411¾	256·0
Paukkan Station mile 418	350·0
Bottom of depression mile 420¾	321·0
Top of Northerly ridge mile 421½	338·0
Wetlet Station mile 428¼	273·0

The line between Wetlet and Paukkan is straight throughout and immediately north of the site of the accident there are about 600 feet of very light cutting and at the site itself a bank of a little over 4 feet, followed to the south by another light cutting. The country is open and being situated in the dry zone is subject to spasmodic rather than continuous heavy rainfall. The track consists of 60 lb. rails carried on hardwood sleepers and Bridge No. 52 was made up of 2 cross connected I steel girders on brick masonry abutments.

Conclusions.

5. The accident was quite clearly caused by the breach of the upper 2 to 3 feet of the railway bank immediately north of bridge No. 52. The Chief Engineer's records show that the bank was washed away in the same location 19 years ago in 1917, but the extent of the damage is not specified. The evidence all goes to show that the rainfall on the night of the 31st May/1st June was exceptionally heavy, and this fact, coupled with the resultant bursting of village tanks, indicates that, whereas the bridge could pass the flood caused by normal rainfall, it was inadequate under abnormal conditions. Owing to the splintering of the track sleepers it was not possible to say where derailment began, but it is fairly certain that it must have occurred not less than 130′ from the bridge, where the real breach started. The impact of the engine with the masonry of the bridge aggravated conditions and probably diverted the engine to one side, and the final shock when it ploughed its way into the slope of the bank would reasonably account for the slewing round and telescoping of bogie third class No. 4089, due to the momentum of the following vehicles still underailed. In this respect the swinging of Bogie third class No. 4089 provided a relief for the momentum of the rapidly moving rear portion of the train and probably minimised the amount of damage.

6. The evidence of the driver is that he did not see the breach until he was about an engine length away. There is some doubt about the intensity of rain at the time of the accident, but it is probable that it was not very severe. It was not full day light, but about half light, a difficult time for visibility as every car driver knows. The engine headlight was, according to the driver, burning, but it would not be of great help to him. The driver had already passed bridges 56A and 57 which carry very heavy storm water at times, and states that he saw no men protecting or watching them. This I am prepared to accept. He would not therefore be likely to anticipate any dangerous conditions at Bridge No. 52, which is not generally considered to be a vulnerable location. From the evidence I believe the driver was running at a normal and reasonable speed, had his train under proper control, and saw the breach before he reached it, but too late to avert an accident. He had only sufficient time to obey his natural instincts of closing the regulator and applying the brakes. The driver had received no special caution order and I therefore find that he is not in any way responsible for the accident. He has a total of sixteen months driving experience on the section, and has a good record. The responsibility for the accident must therefore be fixed on the Engineering branch which is concerned with the safety of the running road. The evidence is unanimous in demonstrating that the rainfall on the night in question was exceptionally heavy, and resulted in the breaching of many village tanks, including those situated within the catchment area served by Bridge No. 52. The last time that there was a serious breach of tanks was reported to be 7 to 9 years ago.

7. At Wetlet rain gauge readings are taken daily and the rainfall between 8 hours on the 31st May and 8 hours on the 1st June was recorded as 5·26 inches. A reading of 1·86 inches was taken at 18 hours on the 31st May and a further reading of 3·4 inches at 8 hours on the 1st June, total 5·26 inches. It is further to be noted that there was a fall of 5·26 inches at Wetlet on the 25th of May, recorded

on the 26th. On the 30th there was ·76 inches, recorded on the 31st. There had been consistent small quantities of rain also between the 22nd and the 28th. The above figures are sufficient to indicate that for an area such as Paukkan—Wetlet rainy conditions were prevailing.

In the evidence much has been made of the fact that the heavy rain in the early night of the 31st May ceased towards midnight and that clear weather conditions at that time indicated that danger was past. I cannot accept this and feel quite convinced that all the indications of stormy conditions existed, amply justifying full patrolling arrangements.

The Maistry of Gang No. 9 states that he patrolled his section from the gang hut at mile 419/17-18 towards Wetlet, leaving at 18 hours and returning at about 23·0 hours on the 31st. He then states that he went to sleep and being tired did not wake up till 5·0 hours when he went out again the same way and saw 78 Down approaching Bridge No. 52 down the bank, but was not in time to prevent the accident.

8. The Maistry admits that he was sleeping in his gang hut, which has a corrugated iron roof, and it is difficult to understand how he slept through the torrential rain. Quite apart from this, I consider that the weather conditions were such that he should have maintained a patrol during the rain as required under Subsidiary Rule 200 (2). Had he done so there is every likelihood that the accident would have been averted.

There is no uninterested evidence to support his statement that he patrolled the previous evening and his statement must therefore be accepted. It is also very doubtful whether he was on patrol in the morning or whether he rushed to the site of the accident, having heard the noise of the crash from his gang hut, not far away. The important point is that he was not on patrol early enough to investigate the safety of his track for the passage of 78 Down and he must therefore be held primarily responsible for the accident in that he did not comply with Subsidiary Rule No. 200(2) and General Rule 205(*c*). He admits that he knows his responsibilities in this connection and also that Bridge No. 52 is a danger spot.

9. In deciding whether the Assistant Permanent Way Inspector is in any way to blame it has to be established whether gang No. 9 failed to patrol in spite of adequate supervision and constant pressure brought to bear in regard to patrolling, or whether the supervision was nominal only and the gang was left to follow its own inclinations in the matter. In view of the rain that had fallen prior to the night of the 31st/1st it is obvious that the Assistant Permanent Way Inspector had a very ample and protracted reminder of his responsibilities in the matter of protection of the line from the danger of floods. He should therefore have specially warned his gangs and have ensured that patrolling was being carried out. As there is nothing on evidence to show that the Maistry of gang No. 9 was known to be specially indolent or slack regarding his patrolling and in view of his reported good record, I can only assume that there must have been a measure of slackness in the Assistant Permanent Way Inspector's supervision and in this respect he must bear some share of the blame for the accident.

Under General Rules 197 and 198 (*b*) an Assistant Permanent Way Inspector is held responsible for the condition of his track and while he is not, under the rules, required to patrol the line himself during heavy rain, there is nothing to prevent him exercising a check on his gangs by doing so, and in any case his responsibility can under no circumstances be considered as fully discharged, merely by the issuing of a general order from time to time, in respect of these duties.

10. The evidence of the Permanent Way Inspector indicates that he had taken action regarding the warning of mates on the subject of patrolling. On the other hand the system of recording of flood damages in his office leaves a good deal to be desired, and his answers regarding his acquisition of local flood knowledge at the time of his taking over are unsatisfactory. As the immediate responsible and experienced subordinate in charge of a section of the line, he must be blamed for the breakdown of his patrolling arrangements, which resulted in a serious accident to a train carrying passengers. In view of his seniority and experience his share of responsibility for the accident must be greater than that of his assistant.

11. While every allowance must be made for the fact that the Assistant Engineer, Ywataung, has only been in charge of his subdivision for six weeks, his evidence at the enquiry leaves me with the impression that, in spite of the obvious reminders he received in the form of rainfall and stormy weather, he treated the precautionary measures for the safety of his line lightly and took very little, if any, action to ensure the adequacy of protective measures. It seems that he was rather lulled into a sense of false security by the fact that he was in charge of section in the dry zone : if such is the case, he made a serious error of judgment. The Assistant Engineer's attitude is difficult to understand when his past record is considered. He has been in the Permanent Way branch all his service, and his work is well spoken of by his District Engineer. While, therefore, I should hesitate to blame him to any definite degree for the accident, I am left with a strong impression that forethought, translated into a vigorous supervision of his Permanent Way staff, might have had its effect in a more thorough and systematic patrolling of the line.

12. Regarding the responsibility of the District Engineer, the situation is different. He has two experienced and technically expert officers serving under him, the Assistant Engineer, and the Permanent Way Inspector. The District Engineer's responsibility is therefore a much broader one in such matters as the patrolling of the line, and while he is responsible for the general adequacy of such arrangements in his District, he cannot be held responsible for their breakdown in an individual case. From the office records regarding floods, a perusal of his orders on such matters, and from the evidence of his personal interest therein, I am not in a position to say that there has been any negligence on his part in ensuring the safety of his District from the dangers of flood. I therefore do not hold him in any way to blame for the accident.

13. It would be quite unfair to close this finding without a reference to the rules for patrolling issued by the Administration. The orders are contained in the following paragraphs of the Rule Books :—

General Rule 197 and Subsidiary Rule 197.
Subsidiary Rule 200 (2).
General Rule 202.
General Rule 213.
Subsidiary Rule 215.
Engineering Manual 230 and 231.

It will be seen that the General Rules place a large measure of responsibility on the ganger for patrolling the line, and as he is the one to carry out the patrol and lives close by his section, it is obvious that such must be the case. While the number of accidents that have been averted in the past, by the commendable vigilance and devotion to duty of these men, shows that a considerable degree of trust can be reposed in them, the accident now under review indicates the necessity of supervision from more responsible sources, if an efficient and continuous patrol is to be maintained in areas affected by heavy rainfall.

14. In this respect I consider that the standing orders issued by the Railway are inadequate in that they do not specifically mention the necessity for ensuring, not only that the gangers are aware of their patrolling duties, but that such duties are actually efficiently carried out.

During the enquiry mention was made of certain circulars issued by the Railway on the subject of patrolling in 1932, and the action taken thereon. There is no objection to issuing such circulars as a reminder on such important subject, but I hold that they cannot be considered in any way as a substitute for standing orders on an all-important matter such as the safety of the track, which orders should properly be contained in the Rule Books, carried by all concerned on their work, and frequently consulted.

15. In the evidence a great deal of attention was directed towards the value of list showing locations on the line, particularly vulnerable as regards flood damage. It is obvious that such places must be kept specially in mind when floods occur, but on the other hand the present accident indicates the possible danger of over-attention to them to the exclusion of patrolling from end to end of the ganger's length. As in the present instance a comparatively small breach can cause a serious accident and it may not occur at a well known dangerous location.

Recommendations.

16. (*a*) The orders regarding patrolling of the line in stormy weather should be revised, due attention being given to the supervision necessary to ensure that the gangers actually do patrol at such times.

(*b*) The requirements for special patrolmen should be revised to ensure that in areas on the Railway where heavy and continuous rainfall is experienced, the patrolling is within the reasonable physical capacity of the ganger, where special men have not been allowed.

(*c*) That proper lists of danger locations be prepared in a form readily accessible to the staff concerned, and that such list should be made a special item of handing over papers.

That Permanent Way Inspectors should record all cases of flood damages in their office.

(*d*) That steps be taken to obtain the services of the metereological department for the distribution of telegraphic information regarding anticipated heavy rainfall. Such advices apart from their special local value, serve as a constant reminder of the necessity for precautions.

(*e*) That under General Rule No. 202, every care should be exercised to ensure that the ganger is competent as regards his capacity and trustworthiness in patrolling.

General.

The arrangements for attention to the injured were satisfactory. It was fortunate that a Medical Practitioner, Dr. Surat Singh, was travelling on 78 Down : there is no doubt that his voluntary and timely assistance materially helped to ease the sufferings of those who received injuries in the accident. They were expeditiously removed from the wrecked train and serious cases despatched early to Mandalay Hospital.

The restoration and clearing of the line and the construction of temporary girders on the existing sound portions of Bridge No. 52 were quickly carried out and through running was restored by 22 hours on the 3rd June 1936, 65 hours after the accident occurred.

3. NORTH WESTERN RAILWAY.

Collision Between No. 360 Down Mixed Train and an Up Empty Mela Special at Kalayat on the 18th June 1936.

FROM MR. E. B. N. TAYLOR, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, LETTER NO. 62/T, DATED THE 13TH JULY 1936 (6670-T.).

Description of Accident.

At about 4·50 hours on the 18th June 1936 an empty Up Mela Special was standing on the main line in Kalayat station yard (non-interlocked) where it was held up to cross No. 360 Down mixed train. Arrangements were made to receive No. 360 Down mixed on the loop line but by an error the facing points were set and locked for the main line and signals lowered. Owing to the peculiar morning light the driver of No. 360 Down was unable to spot the points indicator till he was within fifty yards of the facing points. It was then too late to avoid the collision because the engine of the Up Mela Special was standing at a very short distance from the fouling board of the crossing.

2. The Driver jammed on his brakes and his prompt action saved a more serious collision. The force of the impact could not have been very great because not a single vehicle of either train came off the track and there was no damage whatever done to the track. Unfortunately however the jerk caused the rear buffers of the 2nd coach to mount the buffers of the 3rd coach. This 3rd coach was of wood and was telescoped for a length of about 4 feet, and as far as could be ascertained the two killed and the two seriously injured passengers were seated at the end of this particular coach.

3. The total casualties were :—

Two killed.

Two seriously injured.

Sixty-one with minor bruises and abrasions.

Two railway servants slightly injured.

The damages were :—

	Rs.
Engine of Mela Special	880
Engine of 360 Down	1,000
3rd class Bogey No. T. 3495	2,344
3rd class Bogey No. T.-3571	1,657
Petty damages to 4 other vehicles	85
Damages to track	*Nil.*
Total damages ..	5,966

4. First aid was given to the injured by railway staff and some boy scouts who were there in connection with the Kurukshetra Mela. A Doctor from the Patiala State Hospital and two Railway dispensers were taken by trolly to the site which they reached about 3 hours after the accident and the relief train arrived soon after. A second relief train with the Railway District Medical Officer and the District Officers of Delhi Division reached the site within five hours of the accident.

5. The damaged coaches were pushed into a siding and after all injured had been attended to and notes of injuries recorded No. 360 Down continued on its journey about 6 hours late.

Description of locality.

6. Kalayat is a small non-interlocked B class station on the Narwana-Kurukshetra branch of the North Western Railway. The yard consists of a main line and one loop line with a short dead end taking off the loop. Facing points are padlocked. The line is straight for more than half a mile beyond station limits at each end.

7. Signals at each end are—An outer at the adequate distance and a single armed Home Signal at the facing points. Signals do not show which line a train is to be received on but indicators are fixed at the facing points.

8. The working rules for reception of trains at this station are based on General Rule 37. The Station Master shall not give permission to take signals " off " to admit a train until :—

(*a*) all facing points are correctly set and locked;

(*b*) all trailing points are correctly set;

(*c*) the line over which the train is to pass is clear and free from obstructions.

9. The detailed instructions laid down for the staff are contained in the Subsidiary Rules 37/1 to 37/3 of the North Western Railway and are as follows :—

(*a*) the station master on duty decides on which line he is going to receive the train;

(*b*) he sends a pointsman to the facing points with instructions as to the line for which the facing points are to be set and locked and in confirmation of these instructions he issues the pointsman with a brass label clearly marked to indicate the particular line on which the train is to be received;

(*c*) with this brass label as a reminder the pointsman sets the points and locks them for the correct line and then exchanges hand signals with the station master;

(*d*) the pointsman is responsible that the points are pad-locked and the station master personally satisfies himself that the points are set for the correct line by the position of the points indicator;

(*e*) after satisfying himself that the points are correctly set the Station Master has the Home Signal lowered and the pointsman then lowers the outer signal.

Summary of evidence.

10. Fifteen witnesses were examined and I made a careful inspection of the site of the accident and the damaged coaches. I also travelled on the engine of the corresponding train to get an idea of the visibility of the signals and point indicator. The train is travelling almost due east when approaching this station and the driver is facing the morning light. The indicator light could not be seen clearly because of this but the indicator itself could be picked out when the engine head light shone on it.

11. All witnesses admitted that the signals were lowered for the train, and because it was very difficult to spot the point indicator in the peculiar morning light I do not hold driver D'Cruz responsible. He had a very short distance in which to pull up after sighting the indicator and I am convinced that he stuck to his engine right through. Speed at impact must have been well below 10 miles an hour.

12. The next point now is how the train came to be admitted on the wrong line. The evidence is clear that the points were set and locked for the wrong line and the signals lowered for the train.

The men responsible for carrying out these duties were :—

Mehar Singh	..	Assistant Station Master.
Tulla	..	Pointsman.

13. The various duties that should have been carried out and their correct sequence is :—

(*a*) Mehar Singh should have decided which line the train was to be received on, issued instructions to pointsman Tulla and given him the keys of the points and correct line label in confirmation. From the evidence it is fairly certain that this duty was correctly carried out.

(*b*) Tulla should then have proceeded to the facing points. set and locked them and then hand-signalled to Mehar Singh.

14. Tulla admits that he did not go to the facing points. He states that he went direct to the Station Master's quarters to get a provision pass and that Mehar Singh followed him in the direction of the quarters. He also states that he then met Mehar Singh at his quarter and was there given money to purchase provisions.

Mehar Singh denies this and states that Tulla went direct to the facing points ; set and locked them correctly and exchanged signals with him. He (Mehar Singh) then lowered the Home Signal. Mehar Singh states that he then returned to the office and helped Dalip Chand, booking clerk to make out tickets. Dalip Chand, booking clerk, however, is definite that shortly after issuing orders to Tulla, Mehar Singh left the office and did not return. I accept Dalip Chand's statement and conclude that Mehar Singh made a false statement to discredit Tulla's story. I therefore accept Tulla's statement that he did not go to the facing points and did not exchange signals with Mehar Singh and that Mehar Singh followed him to the quarters.

15. I feel convinced therefore that what actually happened was that Tulla after receiving his instructions went straight to the quarters to make the necessary arrangements to leave by that train to fetch provisions. Mehar Singh lowered the Home Signal and trusted to Tulla setting and locking the facing points correctly before lowering the Outer signal. Evidence shows that No. 360 Down was always received on the main line except when a train was crossed and the records show that for the past 5 months No. 360 Down did not cross another train at this station. Tulla arrived at the facing points only just before No. 360 Down was due. His mind had been distracted from his duties by the hurried arrangements he had been making to leave the station by that particular train. He made no attempt to check up with his line label but automatically locked the points for the main line as he had been in the habit of doing every morning and completely forgot about the empty Up train standing on the main line. He did not exchange hand signals with Mehar Singh but since he found the Home Signal already lowered he lowered the outer.

Conclusion.

16. I hold Assistant Station Master Mehar Singh responsible for the accident because he handed out the key and permitted the Home Signal to be lowered before exchanging hand signals with Tulla pointsman and satisfying himself that the points had been set according to his instructions thereby not complying with the North Western Railway Subsidiary Rule 37/3 (*d*).

17. In the case of Tulla pointsman there has been gross carelessness and neglect of duty. He had the correct line label issued to him by Mehar Singh according to the Station Working Rules but neglected to use this as a guide, and did not comply with the North Western Railway Subsidiary Rule 37/3 (*c*). An extenuating feature in his case was that he had received instructions to leave by the very train that he was sent out to receive and so had his mind distracted from his immediate duties.

18. I find it difficult to decide who actually ordered Tulla to prepare to go by that particular train for provisions. Station Master Mohammad Hussain was however aware of the fact that Tulla had often been sent by that morning train for provisions and he also knew from the duty list that Tulla was the man normally employed to receive that morning train. He appears to have never made any effort to find out whether proper arrangements were made in the interests of safety, on the days that Tulla was ordered to leave the station by that train. I do not hold Mohammad Hussain, Station Master, responsible for the accident but I consider that he deserves a reprimand for slack supervision.

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Recommendations.

19. The rules in force for reception and crossing of trains at non-interlocked stations are adequate and this accident could not possibly have occurred if these very simple rules had been observed. Careful questioning brought out the fact that all the staff at this station knew the rules and thoroughly understood them.

20. The defence of the Assistant Station Master was that every thing was correctly set and all rules complied with before signals were lowered and that the pointsman must have unlocked and reversed the points after signals had been lowered.

21. It must be admitted that though improbable it is quite possible and it would undoubtedly be much better if the working were so arranged that once everything is set no alteration is possible without the Station Master's knowledge. To effect this the only method is to make the Station Master himself go to the facing points and take possession of the key of the pad-lock after the points are locked. This cannot be done without increasing staff as the Station Master on duty has also to attend to booking of luggage and passengers' tickets at these small stations.

22. An alternative is to fit all facing points with double-facing points locks. The pointsman after setting and locking the points returns one key to the station master and with this key in his possession the station master knows which line the points are set for, and he also knows that the points are locked and cannot be moved as long as he keeps that key.

23. General Rules permit the use of pad-locks at facing points and there are a very large number of non-interlocked stations so fitted on the North Western Railway where there are seldom more than 3 to 4 trains each way in a day. Accidents have been very few and in the present state of depression one is reluctant to recommend the heavy expenditure required to fit double-facing points locks at all non-interlocked stations. The present system is absolutely safe if staff obey the rules and I would suggest more careful supervision and the imposition of severe penalties at the slightest sign of slackness in obedience to rules.

4. NORTH WESTERN RAILWAY.

Derailment of 18 wagons of "A" Down Goods train between Mahesar and Pano Akil on the 5th July 1936.

FROM MR. E. B. N. TAYLOR, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, LETTER NO. 63/T., DATED THE 11TH AUGUST 1936 (6687-T.).

Description of accident.

While 'A' Down express goods with coupled engines and a load of 70 was running through Mahesar station an open bogie truck (B. K. C. A.) No. 12121 N. W. Railway, 17th from the engines, loaded with timber was derailed at the trailing points No. 11 near Mile 324. The derailed vehicle was dragged for nearly five miles with the derailed wheels bumping along cast iron plates sleeper track and leaving a trail of destruction. At mile 319 the coupling between the derailed vehicles and the head of the train broke, 17 more vehicles were derailed and of these 17, eight were capsized and badly damaged. One of the derailed wagons fouled the up line. This happened at about 2·15 hours.

2. A relief train left Rohri at about 4-30 hours and by 9-30 hours the up line had been cleared and the section reopened to traffic with single line working on the up line. Train No. 7 Up taking the mails from Karachi and Quetta to Lahore suffered about 3½ hours' detention. Single line working had to be continued for 3 days while the debris was being cleared and patch repairs done to the track after which the line was opened at a restricted speed.

3. None of the railway staff on this goods train received any injuries. The damages were :—

(*a*) *Permanent Way.*—Nearly 6,000 Cast Iron plate sleepers and 700 Deodar sleepers broken. The value of this after allowing credit for service already obtained from these sleepers and scrap value, and labour for replacement is Rs. 40,000.

(*b*) *Rolling Stock.*—Rs. 7,000.

Total damages.—Rs. 47,000.

Cause of accident.

4. There is no doubt whatever that the truck was derailed while running through Mahesar yard over trailing points No. 11 near mile 324. Broken parts of the brake gear picked up at the site of this first derailment near points No. 11 clearly indicate that the flange of a wheel had struck these and then mounted the rail. The brake gear of truck No. B. K. C. A. 12121 was suspended from the bogie frame according to the usual standard design—the brake beam hanger is suspended from a pin attached to a gusset plate which is bolted to the frame. There were clear indications that one of the two bolts fixing the plate to the frame had been missing for some time.

5. Just before entering Mahesar station yard the second bolt either dropped off or was sheared off and one end of the brake beam with hanger gusset plate, and brake block attached dropped on to and was dragged along the track. Trailing points No. 14 and 13 show marks of having been heavily struck by these loose fittings but nothing serious happened till trailing points No. 11 were reached when the gusset plate jammed in the space between the two rails near the heel of the switch and was wrenched off the hanger. This gusset plate, which was found lying alongside points No. 11 and showed marks of having been run over by the flange of a wheel, was evidently thrown on to the head of the rail and derailed Truck No. 12121 at these trailing points (Mile 324).

6. From mile 324 to where the final smash up occurred at mile 319/3 the derailed wheels were dragged along the track and did considerable damage to the cast iron plate sleepers. During this period the remaining portion of the loose brake gear continued to be dragged along the track and a brake block dropped off at mile 320/19-18 and the brake beam was found on a girder bridge at mile 320/14-13 in the centre of the track.

7. It is impossible to say with certainty the actual cause of the final smash up at mile 319/3. When a derailed vehicle is dragged several miles along the track there are many things which could happen to wreck a train. It is probable that the breakage of the draw bar between the derailed vehicle and the front of the train may have brought the derailed vehicle to a sudden stop and caused the following vehicles to pile up.

Finding and Recommendations.

8. The primary cause of the accident as already stated was due to the brake gear dropping off a bogie truck and derailing a vehicle.

9. It has long been recognised that the brake gear on all vehicles is a potential source of danger unless some device is fitted to catch these fittings and hold them clear of the track if ever they break loose.

10. The Mechanical Section of the I. R. C. A. in Resolution M/132 at their 7th meeting (1933) decided that wagons would be rejected in interchange after 31st December 1936 if they are not fitted with safety brackets or hangers for brake beams and brake pull rods, and specifications for these safety hangers published in Rule 12 of Chapter II of Conference Regulations, Part III, containing Rules for Train Examiners.

11. On the North Western Railway all coaching Stock have already been fitted with these safety hangers and I have been informed that a 3-year programme was drawn up in 1934 for providing these safety hangers on all goods vehicles. The work is expected to be completed in December 1936. A large proportion of the work on goods vehicles has been completed and it was most unfortunate that this particular truck B. K. C. A. No. 12121 which caused the accident was one of the few not yet fitted with safety hangers.

12. The derailed bogie truck was dragged across several girder bridges and at one of these bridges the old type timber wheel guard was badly smashed up. It cannot be said with certainty however that the wheel guard prevented the train from toppling over the bridge, because along the whole length that the derailed vehicle was dragged no marks were found indicating that the derailed wheels were even further from the centre of the track than half the length of a bridge timber.

5. EAST INDIAN RAILWAY.

Derailment of No. 2 A. C. B. Down Passenger train between Bahjoi and Dhanari on the 21st July 1936.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 1743/XIII/36, DATED THE 19TH SEPTEMBER 1936 (6708-T.).

Description of accident.—On the 21st July 1936 Passenger train No. 2 ACB left Bahjoi station on the Bareilly-Aligarh Branch of the East Indian Railway at 8·15 hours, the next stop being at Dhanari, a run of 9 miles. The train consisted of SGS locomotive No. 1287 and five bogie coaches, being in order from the engine 3rd Class No. 4996, Inter Class No. 2174, 1st and 2nd Class No. 2756, 3rd Class No. 4337 and 3rd Class and brake No. 3799. The train was travelling at a speed of over 30 m.p.h. at mile 60 about 2 miles out from Dhanari when at T.P. 60/15 and at about 8·26 hours, the last vehicle No. 3799 derailed of all its wheels and the train was pulled up abruptly resulting in the derailing also of a pair of wheels on the second coach, inter class No. 2174.

2. The track immediately in rear of the train from mile 60/15, the point at which the first evidence of derailment was discernible, for 618′ up to mile 60/18, the point at which the derailed vehicle stopped, was completely ploughed up and destroyed, one rail which had parted at the joint had turned up and driven through the floor of the last coach and was projecting 2½ rail lengths through the rear panel. The track before the point of derailment for a length of 732′ was thrown badly out of alignment though the gauge was retained fairly well.

3. There were four casualties in this accident, all passengers. Three passengers were found injured in the train, two of them seriously, and a fourth was found lying by the track about 50′ in rear of the train, he was badly injured and succumbed after a few minutes, apparently from concussion. He had jumped in alarm from the train.

4. After taking stock of the situation the guard despatched the driver on his engine at 8·38 hours to Babrala for relief. The first relief train arrived from Chandausi at 12-10 hours. The break-down train from Moradabad arrived at 14·20 hours and the material relief train from Bareilly arrived at 17·20 hours. Passengers and the injured persons were taken on by the engine and four empty wagons from Babrala to that station and were despatched to Aligarh at about 15 hours. The injured persons received satisfactory attention and were admitted to the Civil Hospital at Aligarh.

The state of the track hampered operations considerably and it was not until 9·40 hours of next morning the 22nd July that through running could be restored. In the meantime resort was had to transhipment of passengers of all trains.

The cost of damage done amounted to Rs. 5,000.

5. *Description of site of accident.*—The site of the accident is from mile 60/13 to mile 60/18 on the Bareilly Aligarh Branch and extends over a length of 1,400′ of track, the actual point of derailment being approximately in the centre at mile 60/15. The site is in a long length of straight and is itself on the level but situated immediately at the bottom of a 3,000′ length of 1 in 500 gradient in the direction from which the train was travelling. There is no high bank, the average being about 5′. The soil is good and not inclined to be troublesome in the monsoons.

The track on this section of the railway is very varied but at the site of the accident it consists of 75 lbs. I.S.R. rails 30 ft. in length laid on Fowler box sleepers at 12 per rail length. This portion is also fully ballasted with stone.

6. *Evidence and conclusions.*—It is clear from the situation as observed after the accident that the derailment was due to the track being thrown out of alignment, this derangement starting at mile 60/13 with a rapidly alternating distortion up to 6″ either side of the centre line extending over seven rail lengths. There can be no question of buckling. There is very little creep, the rail joints on the section are in order and there had been no high temperatures, the monsoon being in full force and the time of the accident being early morning.

7. The last train to pass over this section was 1 A.C.M., at about 6·50 hours travelling in the opposite direction to the derailed train. The driver of 1 A.C.M. states that the track was in perfectly good order. The driver of 2 ACB states that he was keeping a look out and saw nothing wrong with the track nor did he feel anything soft or uneven with it. He was aware of nothing untoward until he felt the sudden pull from behind.

The Permanent Way Inspector had trollied over the section the previous afternoon and noticed nothing wrong with the track. The gang chart shews that the track had been regularly attended to and had been through packed a month or so previously.

8. It must be concluded therefore that this initial derangement of the track at mile 60/13 actually occurred as the train 2 ACB passed over the spot. It is clear that the locomotive must have travelled in a straight line. The last pair of wheels of the second coach were found to be derailed. They were re-railed and there was nothing found to be wrong with the coach. If this derailment had occurred earlier and been the cause of the distortion of the track it is certain that the 3rd and 4th coaches also would have been badly affected and not only the last vehicle. Furthermore the distortion after the primary oscillation continues to the left side only and to such an extent that it could not have been done by the swaying of only the last vehicle which derailed. It seems that as the engine passed mile 60/13 a slight distortion of the track occurred either under or immediately behind it. This irregularity affected the coaches and set up in them a thrust to the left. The earlier coaches retained the track in their forward course but increased the deviation progressively, each adding about 6″ to it, until it attained 3′ from the centre line at which point the left box of the sleeper slipped off the ballast, the track canted and the last vehicle which was then over that spot derailed.

9. As already stated the track is of 75 lbs. rails on Fowler box sleepers. This is an old type of sleeper and has a smooth base. The track is definitely on the light side and the Permanent Way Inspector states that he has more difficulty with this type of track than with any other, he has previously found it to become kinky and has definitely noticed that heavy engines affect it.

The types of engines working this branch are CA and SGS. It is to be noted that the speed limit for CA is 40 m.p.h. but for the heavier SGS it is fixed at 35 m.p.h. It is therefore recognised that the track is not suited to an SGS locomotive at high speed. Witnesses state that the train was travelling at its usual speed and the driver makes no closer estimate than that he was travelling at over 30 m.p.h.

10. The run Bahjoi to Babrala is one of the fastest on this branch. The section speed is 40 m.p.h. and all trains, whether worked by SGS engine or not have to attain this speed in order to maintain the booked timings. The distance is $16\frac{1}{2}$ miles, there is halt of at least one minute at Dhanari in the middle and the time booked start to stop is 31 minutes. Allowing one minute lost for each start and each stop and one minute at Dhanari halt, a total of 5 minutes, leaves 26 minutes for the run or a mean speed of over 38 m.p.h. To achieve this a driver must reach speed well over 40 m.p.h. at favourable points on the track.

11. The site of the accident is as favourable as it could be for maximum speed, on the straight and immediately at the bottom of a long grade, a 1 in 500 for 3,000 ft. The train was a light one, the load being five coaches instead of six, and even then it took over 600′ to pull up to a stop. It was running almost to right time, the guard's journal gives 8·15 hours, one minute late, leaving Bahjoi, and 8·26 hours as the time of the accident; the train had thus covered $7\frac{1}{2}$ miles in 11 minutes, or a speed including the start well exceeding 40 m.p.h. The driver on the other hand contends that he left Bahjoi at right time and that the accident occurred at 8·28 hours. This would bring his speed down to about 35 m.p.h. the maximum permissible for his type of engine. If he intended observing this how then could he maintain his booked timings ? All the circumstances point to the probability that the train was travelling at well over 40 m.p.h., at the time of the accident and it is reasonably to be expected that it was so. I therefore accept the guard's version as correct.

12. The engine concerned has been examined and is found to be in good order. There is no excessive slack or wear which would induce hunting. The SGS is a

heavy engine 16·85 tons axle load, it is six coupled and has a short rigid wheel base. These features tell severely on a light track at high speeds. The track at the scene of the accident is light and the type of sleeper, according to the Permanent Way staff, does not grip the ballast too well on account of its smooth base. The conclusion is that the combination of all these factors caused the track at mile 60/13 to distort laterally under the engine. This distortion set up an oscillation and side-thrust in the coaches which, with a progressive action, developed the defect in the track and culminated in the derailment of the last coach.

13. I am therefore of opinion that the accident was due to a heavy engine travelling at considerably more than its permissible speed, in order to maintain its booked timings, over a track that was unable to stand up to it and gave way at a weak spot.

14. *Recommendation.*—I recommend either that SGS engines should not be run on this section if the present timings are to be maintained, or that the time table should be revised and the timings so arranged that they can be kept, without a driver having to exceed the speed permissible for this class of engine.

6. GREAT INDIAN PENINSULA RAILWAY.

Derailment of No. 50 Up Grand Trunk Express at Bilochpura station on the 7th September 1936.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, LETTER NO. 2009, DATED THE 22ND SEPTEMBER 1936 (6768-T.).

Description of the Accident.

No. 50 Up G. I. P. Railway Delhi-Madras Express, travelling between Muttra and Agra on the 7th September 1936, was partly derailed soon after passing the outer Signal of Bilochpura Station through which it was running.

The train was marshalled as under :—

(1) Engine No. 431 D 4—Driver F. G. Coles.
(2) N. W. Railway 4-wheeler Refrigerator Fruit Van No. 7144.
(3) N. W. Railway 4-wheeler Refrigerator Fruit Van No. 7164.
(4) N. W. Railway 4-wheeler Refrigerator Fruit Van No. 7497.
(5) S. I. Railway 4-wheeler Fruit and Parcels Fruit Van No. 612.
(6) G. I. P. Railway Bogie Composite III Class leading No. 4927.
(7) No. 2825.
(8) G. I. P. Ry. Bogie Passenger Stock No. 3818.
(9) No. 2826.
(10) G. I. P. Railway Bogie III and Brake Van No. 5418.
(11) G. I. P. Ry. Bogie Buffet car No. 4696.

2. The engine and leading refrigerator van having broken away, remained on the rails and came to a stand 260 ft. inside the facing points, Bilochpura. The 2nd 4-wheeler fruit van was thrown to the left of the line, capsized and smashed about 1,100 ft. outside the facing points, its wheels lying down the bank about 50 ft. further out. The next two 4-wheeler vans were telescoped badly and flung to the right of the line about 1,000 ft. outside the facing points. The leading bogie passenger vehicle No. 4927 G. I. P. with front smashed had derailed and carried on for about 100 ft. and was 900 ft. outside the facing points.

The next 4 passenger bogies were derailed on the track but remained standing on the ballast. The last 2 vehicles remained on the rails.

3. The first point of derailment was 1,500 ft. outside the facing points and 1,760 ft. from the point where the engine came to rest.

4. The accident occurred at 22·30 hours on 7th September. No. 197 Down and No. 198 Up Punjab Expresses were transhipped at the site of the accident and subsequently all important trains between Delhi and Agra were diverted *via* Tundla and the E. I. Railway route, and other passenger trains were transhipped.

The line was cleared to all traffic at 11 hours on 9th September and so had been blocked on account of the accident for 36½ hours.

5. Medical first aid was rendered to the injured persons from the First Aid Box and then the Senior Assistant Surgeon, G. I. P. Railway, Agra, arrived by car with the Station Master and Permanent Way Inspector, Agra, at 23·45 hours and examined and treated 2 injured.

The Relief train arrived at 1·45 hours from Agra.

6. The first intention was to lay a diversion on which to restore through traffic, but this was abandoned as there was no permanent way available on the Relief train and the derailed bogies were rerailed and the track relayed. A fortunate circumstance in this respect was that the accident occurred at Bilochpura Station, and so the loop line at the station was stripped to provide the necessary track for replacement of that damaged.

7. The Police report 3 persons slightly injured of which one was treated at the Thomson Hospital, Agra. A general statement of the damage done to Railway property indicates damage approximately to the extent of Rs. 40,000.

Description of the Site of the Accident.

8. The accident occurred at mile 838/11 of the Delhi-Bombay Main Line of the G. I. P. Railway between the Up Outer Signal and up facing points of Bilochpura Station with Agra Cantonment Station at mile 835, 3 miles away.

The Up approach to Bilochpura is on a straight to mile 838/7 then a flat $\frac{1}{2}°$ curve carries it into the station.

The first derailment took place near mile 838/11 on a falling gradient of 1/500 with the line on low bank of 2 to 3 ft.

The speed of the train was 50/55 miles per hour and the night was clear but dark.

The Evidence.

9. The evidence at site is that :—

(*i*) The first derailment of presumably van No. N. W. R. 7164 occurred at mile 838/11 and the van was dragged derailed for some 500 ft. to mile 838/9-10.

(*ii*) At the end of this drag the leading couplings of this van broke and the momentum of the 7 passenger bogies behind flung this van to the left of the track where it smashed and capsized. At the same time the next two 4-wheeler vans were telescoped and thrown to the right of the track.

(*iii*) The momentum of the bogie passenger stock having brushed these four-wheelers aside the 5 bogies ran on derailed for a further 100 ft. before coming to rest.

(*iv*) After the break of the couplings at mile 838/9-10, the vacuum brake was automatically applied on the bogies following and helped to bring them to rest after travelling 100 ft., but even with this application of the brake the engine and leading 4-wheeler van ran for 1,335 ft. before coming to a stand.

10. The evidence shows that :—

(*i*) for 400 ft. after derailment of van No. 7164 the derailment was unnoticed ;

(*ii*) after the breakaway the vacuum brake was applied automatically and brought both parts of the train to rest ;

(*iii*) the Guard and Driver of the train were unaware of the derailment until brought to a stand by the automatic application of the brake.

11. As to the cause of the accident we have :—

(*i*) Van No. 7164, the first vehicle affected.

(*ii*) The journal of the wheel of van No. 7164 obviously heated and broken off.

(*iii*) The axle box of van 7164 in flames after the accident but fortunately with the van capsized and lying upside down. This axle box was in the air so that the fire was easily extinguished and did not spread to the train.

12. Information as regards the axle of van No. 7164 that failed is as follows :—

(1) Manufactured—Patent Shaft and Axle Tree Co., 1902.

(2) *Axle tested.*—N. W. Railway Mogulpura Shops, $\frac{\text{N. W. R. 191/21031}}{\text{M. G. P. C. 28-11-1931}}$.

(3) *Type of box.*—I. S. R. 1933 K. E. W.

(4) *Box last oiled.*—Howrah 25th August 1936.

(5) *Box last packed.*—Howrah, 9th August 1936.

Conclusions.

13. I consider that the accident was the direct result of the overheating and breaking off of the journal of the right hand rear wheel of N. W. Railway Fruit Refrigerator Van No. 7614 and that the N. W. Railway administration must accept responsibility for the accident.

14. The van is a N. W. Railway one and the failure was with that Railway's stock, or possibly want of oiling on that Railway. The van had just run from Quetta or Chaman to Delhi, a long run and was almost certain to need oiling at Delhi before facing the very long fast run to Madras. I am sceptical of the special oiling ordered at Delhi having been done, because the Van was received at Delhi at 16·30 hours and had to be repacked with ice and shunted on to No. 50 Up Grand Trunk Express before its departure, all within about 1½ hours and the shunting alone would take most of this time.

15. I have drawn attention to the fact that after the first derailment the two parts of the train were brought to a halt by the vacuum brake being applied automatically while the Guard and Driver took no action. I exonerate both these from blame as neither had time to take any action between the derailment and the smash.

General Remarks and Recommendations.

16. I am strongly opposed to the marshalling of these light 4-wheeler vans next to the engine and ahead of the heavy passenger bogie stock on fast Express trains. In this particular accident, the damage would have been at most 1/10th of what it was, and there would not have been any injured passengers and what is more, the grave risk of very serious injury to a large number of passengers would not have been incurred if the 4-wheeler vans had been in the rear of the train.

17. Except for the fortunate circumstance of the accident occurring in a station yard there would have been considerable delay in restoring through traffic for want of the Permanent Way necessary to repair the track. The Administration holds large surplus stocks of Permanent Way material at various depots and stores centres. Some of this stock might very easily and without expense whatever be held as part of equipment of Accident Relief Trains where it would be more regularly and frequently subject to inspection and accountancy and in case of accident more readily available for urgent repairs. This is done on most Railways in India but not on the Great Indian Peninsula Railway.

7. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Derailment of No. 7-20 Down Special Goods train at mile 101/9-10 between Maonda and Dabla stations on the 13th September 1936.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, LETTER NO. 2037, DATED THE 3RD OCTOBER 1936 (6814-T.).

Description of the Accident.

No. 7/20 Down Special Goods travelling between Phulera and Rewari by the Chord Line had one wagon derailed at mile 101/10-9 and dragged to mile 100/16 where the engine and 7 wagons broke away and carried on, the train coming to rest between mile 101 and 100/16. The train consisted of engine, 21 Vacuum braked goods vehicles, 42 non-vacuum braked goods vehicles and a brake van. After the first 7 wagons had broken away, the next 14 wagons derailed and capsized and the 15th derailed. All the remaining wagons remained on the rails.

2. The damage to permanent way is estimated approximately at Rs. 1,000 and to Rolling Stock at Rs. 15,000 making a total of Rs. 16,000. There was little or no damage to the contents of the wagons which were all fully loaded but with piece goods principally and general goods. The last 39 wagons on the train were loaded with cattle but fortunately none of these wagons were derailed and none of the cattle and their attendants were reported as being injured in any way. The accident occurred at 11·40 hours on 13th September. Through running was resumed at 11 hours on 14th.

Site of the Accident.

3. The first derailment occurred at mile 101/9-10 of the Rewari-Phulera Chord of the B. B. and C. I. Railway Metre Gauge, and the smash with the capsizing of the wagons between mile 100/16-18. The mileage is taken from Delhi.

The track was found in good order after the accident, the weather was fine, there had been no rain for 2 days and the banks were low.

4. The accident occurred near the bottom of a long falling gradient and about $1\frac{1}{2}$ miles from Dabla. The grades fall practically the whole way from Maonda to Dabla with a final fall at 1/150 for about $3\frac{1}{2}$ miles to Dabla Station. It was about 2 miles down this grade that the first derailment and the accident occurred.

The Evidence.

5. The evidence and my enquiries show that :—

(*i*) One wagon of the train (about the 8th) derailed at mile 101/9-10 and its derailed condition was noticed by both Guard and Driver before the crash.

(*ii*) Both Guard and Driver applied their brakes and soon after this application the crash came near mile 100/16. There was then a breakaway of the engine and 7 vehicles all connected with the vacuum brake which was thus applied automatically and soon brought these to a stand.

(*iii*) The Driver states he then went forward again and came to a stand.

The train finally came to a stand as below :—

Engine and 3 vehicles—a parting—4 vehicles—a parting—14 capsized vehicles (end of vacuum)—1 derailed vehicle—remaining vehicles on the rails.

6. A careful examination of the track showed it in good order with no recent rain, work on it, or tampering to affect its security.

A careful inspection of the stock shows all wagons fully loaded, no signs of any heated axles or bearings and no missing or broken parts. Therefore there would appear to be no weakness or failure in the stock that could have been the cause of the original derailment.

7. The leading wheels of wagon No. 16506/Z. 4, the 10th from the engine and the 3rd of those capsized, was scored by ballast, etc., and was the only wagon showing such marks, thus indicating that this was apparently the one wagon first derailed and the cause of the subsequent crash. This wagon though capsized was hardly damaged and was intact as to axles, bearings and couplings and was fully and evenly loaded.

Conclusions.

8. As to the cause of the original derailment I regret I am unable to come to any conclusion except that it was wagon No. 16506/Z. 4, the 10th from the engine which was first derailed.

As to the crash subsequent to the derailment I consider that :—

(*i*) the Driver, when he saw that a wagon had been derailed and with the speed down the heavy grade, applied his vacuum brake too severely for the load of 54 wagons he had behind the derailed vehicles of which 42 were non-vacuum and so not affected by his application of the brake ;

(*ii*) the momentum of the wagons behind the derailed 10th wagon slewed this wagon No. 16506/Z. 4 round, and this slewing pulled aside the 8th and 9th wagons just ahead of it ;

(*iii*) the Driver then released his brake and went forward with 7 wagons, breaking the couplings between the 7th and 8th wagons ;

(*iv*) the wagons in rear of the 10th piled up against it capsizing 11 more wagons and derailing one before coming to a final stand.

9. I consider therefore the Driver's action responsible for the crash and serious results, but I cannot hold him really to be very blameworthy as under the circumstances most men would have acted as he did.

General Remarks.

10. The 21 wagons leading on the train were one Z/5 and twenty Z/4 type wagons and it was most marked how little they suffered in the very severe crash. It was particularly remarkable and pleasing to note how well all the couplings of the capsized wagons held even when bent round about 90°. The quicker this type of coupling replaces the older and very much weaker types which are the cause of the frequent and dangerous breakaways on the Metre Gauge Railways of India, the safer and cheaper goods train working will be.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 31st March 1937

No. 21

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1. EASTERN BENGAL RAILWAY.

No. 94 Down Passenger train running into a sand humped isolation dead-end at Dum Dum Junction on the 3rd December 1936.

FROM MR. R. B. SETH, GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 2, CALCUTTA, LETTER No. 48/1010/83, DATED THE 18TH JANUARY 1937. (6849-T.).

Description of the Accident.—While approaching Dum Dum Junction Khulna Branch Train No. 94 Down, Dattapukur Local, *ex*-Dattapukur to Calcutta, entered sand humped isolation dead-end provided at the North end of the station to isolate the Khulna Branch from the Main Lines. The engine and the vehicle next to it, a bogie Third and Brake Van No. 1788, went through the sand hump down a 20 feet high bank. The engine capsized completely and lay with chimney down and wheels up. The body of the bogie Third and Brake Van was wrenched off the under-frame, thrown lower down the embankment (near a tank of water) and was smashed, the under-frame was on the slope of the bank and was twisted and bent. The remainder of the train was on the rails and suffered no damage except the head stock and buffers of the second vehicle from the engine.

2. The train consisted of 6 bogie passenger vehicles with a four-wheeled coaching goods wagon in the rear drawn by a 2-6-4 Type Tank Engine (B. T. C. Class No. 647) running chimney first. The weight of the engine and train was about 300 tons and the overall length about 494 feet. The vacuum brake was in operation on all wheels of the vehicles and on the coupled wheels of the engine, brake power being about 83·3 per cent.

3. The train was well filled with passengers, the vehicle next to the engine was crowded chiefly with vendors. I regret to report that one passenger received fatal injuries, 19 passengers were admitted as 'In-door' patients in Hospitals at Calcutta and 7 received treatment as 'Out-door' patients. Of the Railway employees, the driver, both the firemen and a Khalasee of Engineering Department received minor injuries.

The amount of damage to rolling stock is estimated at about Rs. 25,000. There was no damage to the Permanent-way.

4. The injured received early medical attendance. First Aid was given by the Guard of the train and a local medical practitioner. The Chief and District Medical Officers of the Railway reached the scene of the accident within an hour of the occurrence.

The relief Train arrived at the site of the accident at about 8-2 hours and line was cleared for through working at about 8-52 hours.

The weather was fine and clear and the rails dry.

5. **Description of the locality of the Accident.**—The accident occurred at the North end of Dum Dum Junction which is situated $4\frac{1}{4}$ miles north of Calcutta on the main line of the Eastern Bengal Railway. The Khulna Branch, which is single line, enters the yard at this end and a sand humped dead end has been provided to protect the junction and isolate the Branch. The scene of the accident was this Dead end.

6. The line is on a right handed curve of 2,000 feet radius for 2,321 feet, it then runs straight for 2,400 feet turning finally into a left handed curve 2,000 feet radius and 2,410 feet in length to the junction point. The speed is restricted to 30 miles an hour on both these curves. The length of the run on which speed is not restricted between Dum Dum Cantonment and Junction is only 1,008 feet. There is an Up grade of 1 in 400 from Dum Dum Cantonment to Dum Dum Junction.

7. At the Branch line entrance to Dum Dum Junction, in addition to the speed restriction of 30 miles an hour which starts 2,528 feet in rear of the points of the isolation dead end and 472 feet in rear of the Outer

Signal, there is a speed board at 182 feet in rear of the points of the dead end and 128 feet in rear of the Home Signals restricting the speed of all Down Branch line trains entering Dum Dum Junction to 15 miles an hour. Thus the speed from 472 feet beyond Branch line Outer Signal to 128 feet short of the Home Signals is restricted to 30 miles an hour and onward further restricted to 15 miles an hour.

8. The isolation dead-end takes off to the left of the 2,000 feet radius curve at the entrance to Dum Dum Junction by a 1 in $8\frac{1}{2}$ crossing, the points which are numbered 26, being 54 feet inside of and from the Home signals. The length of the dead-end was 315 feet from points to sand hump with a hump of only 30 feet. The bank which is about 20 feet high ended a few feet beyond the sand hump. There is a road under bridge 126′ beyond the sand hump the length of which is such as to take this dead-end if extended.

9. Dum Dum Junction is worked as a Class 'B' station in all directions. It has two cabins, North and South, of which North controls the entrance of Branch Line trains from Khulna and is connected to Dum Dum Cantonment by Neales Token Instrument.

There are six train reception and despatch lines at Dum Dum Junction. From West to East, Road No. 1, Up Fast (Main) Line, Road No. 2, Down Fast (Main) Line, Road No. 3 Up Slow (Quadruple) Line, Road No. 4 Up Through (Calcutta Chord Railway) Line, Road No. 5 Down Through (Calcutta Chord Railway) Line and Road No. 6 Down Slow (Quadruple) Line. There are platform faces only on lines Nos. 1, 2, 3, and 6.

10. The station is fully interlocked. The signalling is three aspect semi-automatic colour-light—Red, Orange and Green. The joints are electrically operated by means of electric switches and signals are also controlled by electric switches. Interlocking between levers is mechanical. All 'Home' and 'Starting' signals are detected with the relevant points electrically. The roads are track-circuited and the passage of trains is indicated automatically in each cabin. All signals are automatically reversed to the normal, *i.e.*, Red aspect, immediately the train passes it and occupies Track-circuit in advance. All Outer Signals at this station are free of the Home signals concerned.

11. The Green aspect of the Signals is not operated from the cabins but is automatically controlled by the next signal in advance as well as by the nature of the road setting in advance : if the next signal in advance is in the 'Off' position, and the road is set straight the yellow aspect will automatically change to Green.

12. **Report and Evidence.**—Cabin Assistant Surendra Chandra Ghosh, who was on duty at Dum Dum Junction North Cabin at the time of the accident, stated that he gave Dum Dum Cantonment Permission to Approach (Line Clear) for train No. 94 Down which left 2 minutes late, at 7-2, and, as road No. 6 was occupied by No. 28 Down (Sirajgunj-Calcutta Passenger), he in consultation with the Section Controller decided to receive No. 94 Down on line No. 2, after it had been cleared by No. 2 Down (Darjeeling-Calcutta Mail) which was then approaching his station. To save detention to No. 94 Down he pulled off Outer Signal No. 37, which is free of Home Signals, and set as many intermediate points for the reception of No. 94 Down as the interlocking and Track-circuit allowed him. Before he could fully set the road, train No. 94 Down came in, entered the isolation dead-end and met with the accident.

Cabin Assistant Narain Chandra Rakhit, who came on duty at 7-0 hours and was to take over from Ghosh, has confirmed generally the statement of Ghosh. Both he and Ghosh have stated that they have a number of times controlled train No. 94 Down at the Home Signal after having pulled off the Outer.

13. Jahir, driver of No. 94 Down, has stated that both the Outer (No. 37) and Home (No. 35) were showing Orange. He said that he shut off steam after passing the Outer signal and when passing the 'Home' felt

a jerk and found that he had entered the isolation dead-end and immediately applied the vacuum brake, but was unable to stop the train before his engine rolled down the bank and capsized. He said that he knew that at an interlocked station like Dum Dum Junction the Home Signal cannot be pulled off till the road is properly set, and added "But perhaps cabinman can sometimes reverse the points in the face of an approaching train".

He said that he had no trouble with the brakes and that he had full 20" of vacuum. He could see the Home Signals at Dum Dum Junction very distinctly during part of the run and had never confused Orange aspect with the Red. He said he knew the section well and was aware of the speed restrictions between Dum Dum Cantonment and Dum Dum Junction which he always observed and that on the day of the accident his speed at the Outer was 40 miles an hour and at the time of entering the dead-end 15 miles an hour. At Dum Dum Junction he always had Outer and Home off together and never got Orange at the Outer and Red at Home though he knew that at some interlocked stations on the Southern Section, the Outer can be 'Off' with the Home Signal 'On'.

14. The fireman, Golam Nabi, generally corroborated the driver's statement. He stated that when working with other drivers, but not when working with Jahir, his train had been stopped once or twice at the Home Signal at Dum Dum Junction, the Outer showing Orange with Home showing Red.

15. The District Locomotive Superintendent, Calcutta, Mr. MacAulay, has stated that the brake blocks of the engine were new and gripping the wheels hard, there were no skidding marks on wheels and that in his opinion the speed at the time of the accident was 30 miles an hour. As far as his experience goes drivers generally observe the speed restrictions between Dum Dum Cantonment and Junction and he had no definite complaint as to non-observance of these restrictions by drivers. Though he considers the Colour light signals at Dum Dum Junction satisfactory yet, in his opinion, Orange and Red may be confused momentarily in the day time when there is bright sunlight in the back ground and that he himself had on one occasion momentarily mistaken the Red for the Orange. He stated however, that no complaints had been received from any of his drivers prior to this accident.

16. The Guard of No. 94 Down, Dolmar, said that the Outer was showing Orange but he did not look out to see the Home, the speed of the train was its 'usual normal speed' and when the accident occurred it was about 15 miles an hour, he did not feel any application of brakes and that he had no First Aid Box in his brake van and rendered First Aid by improvised bandages.

17. About the aspect of the Outer Signal No. 37 there is no conflict of evidence. All agree that it was showing Orange. The driver was therefore, entitled to pass it cautiously and to be prepared to stop at the next signal, *i.e.*, the Home Signal. That he exercised this caution is not borne out by the occurrence. The Home Signal No. 35 could not have been taken off with points No. 26 in their normal position, *i.e.*, set for the isolation dead-end, the interlocking in the cabin which was in good condition made it impossible to do so. Driver Jahir had said that the points may have been reversed while he was approaching the Home Signals. The Home Signals Nos. 35 and 36 are provided with Time Release and it would take over two minutes to reverse the points after throwing the signals back to danger, a period which is considerably more than that required for the train to cover the distance from the point where the driver could see the aspect of Home Signals to point No. 26, even if the train was proceeding at 15 miles an hour. I therefore, cannot accept the version of the train crew that the Home Signal No. 35 was showing an Orange aspect when No. 94 Down approached it.

18. Driver Jahir, according to his own statement passed the Outer signal at a speed of Forty miles an hour, a speed in excess of the permissible Thirty. The speed at which the engine entered the isolation dead-end

is stated by the engine crew and the guard as 15 miles an hour. With this speed and 83·3 per cent. of brake power calculations show that the driver should have been able to pull up in less than 180 feet and not gone through the sand hump. Calculations show that with this particular train even at a speed of 20 miles an hour an alert driver would not have gone through the sand hump and would not have come to any serious grief even at 25 miles an hour—the limiting speed for this particular train at which the engine would have gone through the 30 feet of sand hump if brakes were applied as soon as the engine entered the dead-end is as high as 30 miles an hour and for it to go beyond the bank will be somewhere in the neighbourhood of 35 to 40 miles an hour.

19. It is significant that most of the witnesses have described the speed at which the driver entered the dead-end as 'usual normal speed'. This raises the question whether the drivers usually do not observe the speed restriction of 15 miles an hour and enter Dum Dum Junction Yard at as high a speed as 30 to 40 miles an hour. Mr. MacAulay had said that he had received no definite complaint on this score, but absence of definite complaint by itself does not prove that this does not occur.

In the opinion of Mr. MacAulay the speed at which the engine entered the dead-end would have been about 30 miles an hour. From the circumstances of the accident I agree with this view and cannot accept the statement of the Engine Crew and the Guard that the speed was 15 miles an hour.

20. The isolation dead-end did not have the full 50 feet of sand hump and 50 feet of Rail level formation beyond, as provided in the standard type drawing. The isolation dead-end is meant to act as a safety device in cases where drivers overshoot the Signals and should have been maintained to meet this emergency with due factor of safety. Its location at the edge of 20 feet bank makes it imperative that it should have been especially re-inforced and not kept below the standard.

21. **Conclusions.**—From the evidence and the circumstances of the accident I am led to the conclusion that the Home Signals, both Nos. 35 and 36, were at danger. It is difficult to explain why the driver failed to see and act up to them. I can only account for his failure to see the indication of the Home Signals which was in his line of vision for at least 10 seconds by the assumption that having never previously been stopped at the Home Signals and having always got Orange at the Outer and Orange at the Home, never Red at Home with Orange at the Outer, he assumed that the Outer can only be off if the Home signal is also off, as is the case at other interlocked stations with Semaphore signals, and having got Orange at the Outer did not worry to see about the indication of the Home. 'Free Outers' may be misleading and not quite fair to staff when Free Outers and the interlocked Outers are of the same type and there is nothing to distinguish between the two, but at Dum Dum Junction there is a distinct type of signalling, Colour Light. Having a distinctive type of signalling at Dum Dum Junction, I do not think the driver had a valid excuse to expect Home Signals to be off as a matter of course when the Outer is off and no excuse whatsoever to fail to observe its indication.

22. Little or perhaps no damage would have resulted had the driver observed the speed restriction of 15 miles an hour and not entered the Yard at an excessive speed. It appears that the Time Table does not make adequate allowance for this restriction. The booked time for this run of 2 miles, between Dum Dum Cantonment and Dum Dum Junction where for the greater part of the distance the speed is restricted to 30 miles an hour and for some distance to 15, is only 5 minutes, hence the drivers cannot keep time without slightly exceeding speed limits. However, I do not think the driver had a legitimate excuse in running the train at a speed as high as 30 to 35 miles an hour on a stretch where he is enjoined not to exceed a speed of 15 miles an hour.

23. In my opinion, Driver Jahir of No. 94 Down is responsible for the accident by breach of Rules 76, 78 and 89 of the General Rules for the Indian Railways, in that he passed the Home Signal at Dum Dum Junction at danger and was running the train at a speed greatly in excess of that sanctioned. He is a man of 50 with 18 years service of which 8 years he has worked as a driver and has a good record.

24. **Remarks and Recommendations.**—The accident raises the question whether 'Free' Outers give adequate safety. 'Free' Outers are in common use on other railways and should not lead to dangerous conditions if worked according to properly made out working rules, though certainly an Outer interlocked with Home gives greater safety than a 'Free' Outer. In this particular case of the Branch Line signals at Dum Dum Junction an extra factor of safety exists due to the permanent speed restriction of 15 miles an hour, hence I refrain from recommending the interlocking of the Outer signals with the Home at this busy junction even though the Home is not visible throughout the run from Outer to Home.

25. Due allowance should always be made in the time table for permanent speed restrictions so that the drivers can keep up time without having to exceed the speed limits.

26. The isolation dead-end at Dum Dum Junction should be strengthened so that the heaviest goods train allowed on the section while running at 20 miles an hour with the minimum permissible brake power can be controlled with due margin of safety. The bank round this dead-end should be widened.

27. There was no First Aid Box in train No. 94 Down Passenger. First Aid Boxes should be provided as a part of the guard's equipment as required by the Railway Board's orders dated the 9th December 1929.

2. EAST INDIAN RAILWAY.

Collision between No. 30 Down Passenger and No. 41 Up Parcels Express at Barhan Station on the 5th December 1936.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 126/XIII/36, DATED THE 20TH JANUARY 1937. (6851-T.)

Description of accident.—On the 5th December 1936 it was arranged that the two trains No. 30 Down Mixed and No. 41 Up Parcels Express should cross at Barhan station at about 5-30 hours in the morning. The former train was a passenger train booked to stop at Barhan and consisted of an engine with six bogie coaches, a brake van and third class leading followed by an intermediate and third class then a composite first and second class two more third class and finally another brake and third class. The Parcels Express was a fast train booked at over 50 miles per hour and was not intended to stop at Barhan station. The train consisted of an engine and 6 bogie coaches (two third class, one upper class composite, an intermediate and two Luggage vans) followed by 9 four wheeled goods vehicles and a brake van.

2. The arrangement was that the stopping passenger should be admitted to the platform loop and the fast parcels express should run through on the straight. For this purpose the down signals were lowered after setting the points at both ends of the loop for that line according to practice, and the up signals were kept at danger to detain the express until such time the passenger train had been safely received and the points reset to pass the fast train.

3. It was a densely foggy morning and both trains approached the station limits from opposite directions at the same time. The down passenger train correctly passed the signals and ran into the loop slowing down to stop, but the Up Express failed to observe the signals kept against it at danger and ran through them, also into the loop from the south end. The driver realising from the turn out from the straight that something was wrong immediately proceeded to stop his train and had undoubtedly dropped to a very slow speed by the time that the two drivers were aware of each other's presence, facing and approaching on the same line. This could have been only when they were a very short distance apart and neither driver was able to avoid a collision. This took place and both trains stopped dead.

4. The fore ends of both locomotives were badly crumpled but no really serious damage was done. The first and second coaches of the Parcels Express partially telescoped into each other and so did the second and third coaches of No. 30 Down. There was no derailment except for a bogie trolly of one of the damaged coaches.

5. Unfortunately one passenger who was seated in one of the telescoped coaches, the second of the parcels express, was crushed and killed. There were thirteen other persons injured, eleven passengers and two railway servants, but none of them seriously. The Relief train and medical aid were immediately called for from Tundla and arrived at Barhan at 6-55 hours. The injured persons were attended to and they then proceeded on to their destinations. The body of the dead man was handed over to the Police. Detention to the trains was between four and five hours.

The permanent way was undisturbed, the approximate cost of damage to engines and rolling stock was about Rs. 10,000.

6. **Description of site of accident.**—The site of the collision is at the down platform, which is at high level, and at the exact centre of Barhan station in front of the station offices. Barhan is a 'B' class station situated on the single line between Mitawali and Chamroli and about 8 miles from Tundla. It is a standard station and there are no special rules. The

system of working is the absolute Block with tokens in both directions; the interlocking is the ordinary bolt type. The layout is a simple crossing loop.

7. **Evidence and conclusions.**—There was nothing wrong with the movement of the passenger train No. 30 Down, so far as that train was concerned everything was in order. It was the movement of the Parcels Express only which was at fault and it is in this that the cause of the accident lies.

The evidence is conflicting. The station master on duty states that he lowered the signals for No. 30 Down and kept them at danger for No. 41 Up; that he had posted fog signalmen with fog signals for both these trains and had done so for all trains since the fog began, the first train being No. 13 Up which was at about 2-30 hours; that he had heard the fog signals explode for both Nos. 30 Down and 41 Up. Finally he states that he saw No. 41 Up come into his station at the same time as No. 30 Down but moving at a higher speed than that train.

8. The driver of No. 41 Up states that there was very heavy fog since passing the previous station Mitawali; that when he knew from his running time that he should be approaching Barhan he eased down to 25 miles per hour from over 45 miles per hour; that he saw no signals and only when he found his train turning into the loop did he know that something was wrong and immediately proceeded to stop his train; that he had actually done so when the impact took place. On being questioned he stated that he received no indication by fog signals.

9. These two statements are considered in the following paragraphs in the light of evidence by other witnesses and of material facts—

It is not disputed that the station master lowered the signals for No. 30 Down and kept them at danger for No. 41 Up. There is no doubt that the driver of No. 41 Up ran past the signals at danger. He missed them in the fog. There is no doubt that the station master sent out fog signalmen with detonators, the point is whether detonators were actually put on the track for No. 41 Up. The rule is that the station master shall post men with a supply of a dozen detonators and keep them out until the fog is past: actually the station master says that he sent the men out for each train and with two detonators each time. He says that he wanted to keep the men on the alert considering the long interval between trains. Not much fault can be found with this but it was scarcely intelligent of him to send only two detonators each time, any thing might have happened to either or both of them.

10. Confusion arises when a tally is made of the detonators said to have been used. Unfortunately there is no ruling that a record must be kept as to how and when a detonator is used, and that the empty cases must be retained, a few only of these were forthcoming. The station master had made one or two notes in his registers of detonators being sent out for certain trains. Seven trains are said to have been fog signalled and among these are Nos. 13 Up and 41 Up. If all these had been correctly signalled the station master had at least one too many detonators on hand. If they had not been all signalled the station master was short of at least one detonator. In the absence of proper record it was impossible to clear the confusion especially considering the fact that the men posted to the duty of placing the detonators are illiterate gangmen and it would be easy to break a detonator clip or to lose one of them in the dark. Proof by tally of detonators is therefore not possible.

11. The first train said to have been fog-signalled is No. 13 Up. On that particular day on that train it so happened that a senior subordinate, the Power Transportation Inspector of Allahabad, was riding on the engine making a night inspection. His notes are clear. He states that it was misty but there was no thick fog when passing Mitawali and Barhan and that his train neither received fog signals at either station nor did it need them. He did not need them until he got to Jalesar Road and even then at several stations where he did need them they were not provided.

This certainly somewhat shakes the station master's testimony and points to a possibility that detonators were not placed for No. 41 Up as declared by the engine crew of that train. On the other hand two traffic staff on No. 41 Up *viz.*, a signaller and the parcel delivery clerk, both state that they heard fog signals at Barhan station though strange to say they had heard nothing at Mitawali where the driver admits having run over two detonators.

12. The driver's statement is supported by both his firemen that they ran over no fog signals when approaching Barhan station. The performance of No. 41 Up on the run from Tundla up to the time of the accident must be considered. The train is a fast one and from the running time must have attained a speed of fully 55 miles per hour between Mitawali and Barhan. There is no objection to this but the engine could never have taken the turn out safely into Barhan station at such a speed and it is clear therefore that the driver had reduced as he said to about 25 miles per hour. Why did he reduce? Was it, as he states, because he had watched his running time or had he actually received warning fog signals?

Consider the performance at the previous station Mitawali. From the evidence of the driver and fireman two fog signals had been received there but no signals had been discerned! Having received the fog signal warning the train ran straight on past both outer and home, which it so happened were lowered, and on into the station several hundred feet further on picking up the line clear without seeing a single signal! The fireman states "When I picked up the token, I knew it was all right!"

13. On being questioned in regard to this procedure at Mitawali it transpired that there is believed to be some form of code relating to fog signals and accepted universally by drivers. Belief in such a code is widespread, as I have since proved; generally it is to the effect that a single detonator only means stop dead immediately, that two detonators is only indication of the vicinity of a station and that three detonators means proceed cautiously.

Having therefore received two detonators at Mitawali the driver was satisfied that there was nothing untoward and proceeded normally into the station, his faith in the two detonator code of 'all clear' being confirmed by receipt of the token awaiting him.

14. The inference is obvious. Even if he had received the two detonators at Barhan station as declared by the station master the driver would have acted in the same way as he did at Mitawali and would have run on expecting the token to be awaiting him. It is immaterial therefore, whether his slowing down of No. 41 Up was due to his judging the proximity of the station by timing or whether he had received warning fog signals. He would have acted the same in either case. It so happened that the signals were at danger, there was no token awaiting him and the line was set for the loop.

15. Evidence is not conclusive therefore that fog signals were placed for No. 41 Up but I am myself inclined to the view that the station master's statement is correct. The station master in his evidence states that the first words of the driver when he got on to the platform after the collision were "Why you placed two fog signals when the line was not clear". Did then the station master know of the belief by drivers generally in a code for fog signals? I very much doubt it. If he did not, how then could he have produced the above statement in his evidence unless the driver actually made it? Furthermore it is significant the fireman was putting on fire at the moment of his train taking the points. Had the driver received no other indication of the station than from his own timing he would still have been reducing at 25 miles per hour or less and there would have been no question of opening up steam again. I am of opinion that the driver had received what he thought was an 'all clear' indication, *viz.*, two fog signals, and believed that he was about to run through the station. His fireman at once started to make up the fire.

16. Finding that he was turned into the loop the driver did his best to stop his train. The station master is undoubtedly wrong in stating that No. 41 Up came in faster than No. 30 Down. The latter train was stopping and had only a few yards further to travel. The two trains stopped dead on impact and the damage to both is identical. The load of No. 41 Up was almost twice that of No. 30 Down 22 against 12, the speed of the former must therefore have been about half of the latter. At the moment of impact No. 41 Up must almost have stopped.

The headlights of both engines were in good order but these are practically useless in fog.

17. I find that the accident was caused by the driver of No. 41 Up passing the up home and outer signals of Barhan station at danger having been unable to see them in thick fog. I am further of opinion that he passed these signals in the mistaken belief that all was clear having received two fog signals, though there is an element of doubt that the fog signals were placed. No blame for the accident attaches to the Station Master. It is possible that he failed to provide the fog signals but I am satisfied that the driver would have run through and that the accident would have occurred in either case.

18. **Recommendations.—**

(1) Immediate steps must be taken to dispel any idea that a code exists for fog signals or that any meaning is to be attached to the number of detonators exploded by a train. There is only one meaning to the exploding of one or more detonators, they are solely for the purpose of attracting the attention of drivers.

(2) Rules should be issued ensuring that a proper record be kept of all fog signals issued to and used by station staff and a correct account maintained shewing the issue of any detonator for any purpose.

3. GREAT INDIAN PENINSULA RAILWAY.

Fire in R. M. S. Van No. 1776 on the Imperial Indian Mail *ex*-Bombay at Charkhera Station on the 11th December 1936.

FROM MR. L. F. JACKSON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, LETTER No. 2573, DATED THE 22ND DECEMBER 1936. (6856-T.).

Locality of the Accident.—The Imperial Indian Mail train was travelling from Bombay to Calcutta carrying passengers and 3 vans of Foreign Mail. The train stopped at Harda Station, G. I. P. Railway, and then, when passing through Charkhera Station five miles further on, was pulled up by means of the communication chord applied in the 3 R. M. S. Vans.

The train was marshalled with 3 R. M. S. Postal Vans next to the engine followed by the passenger stock. Smoke appeared first in large quantities in the leading portion of the leading van. bogie No. 1776 E. I. Railway.

2. **Description of the Accident.**—It was at about 23-15 hours on 11th December 1936 when the train was running through Charkhera Station, mile 421, that the R. M. S. Staff first noticed smoke issuing from inside the leading Postal Van No. 1. The communication chords were pulled and the train brought to a stand in Charkhera Yard. The leading van was then cut off, drawn ahead, and every effort was made to rescue the mail bags from the burning van and to extinguish the fire.

3. The night was dark but clear. Of the 972 mail bags in the leading Van, 162 were saved and 810 burnt. From the burnt bags and debris some unburnt and partially burnt letters to the extent of about 16 bags were recovered subsequently. Two mail sorters had their hands burnt slightly in endeavouring to rescue the mails.

The mails burnt were all foreign mails received by P. & O. "S.S. Ranpura" at Bombay and were for delivery in Burma (exclusive of Rangoon City), Calcutta City and the United Provinces *via* Itarsi.

4. The burnt bags contained no parcels and no insured packages or letters. The contents were all letters (registered and unregistered) and newspapers. The damage is considerable but cannot be estimated with any accuracy and will fall wholly on the Post Offices and cannot be much less than 1 lakh of rupees. This should cover the cost of the bogie van, owned I understand by the Post Offices, and compensation paid for the burnt registered letters at 50 francs each. The Railways suffered no loss.

5. **The Evidence.**—The evidence is clear and emphatic that :—

(i) The fire started and at first burnt wholly inside the van and so could not be due to a spark from the engine or an overheated axle box or bearing.

(ii) The burnt van was running with closed windows both glass and venetians and no spark from the locomotive could have been blown inside the van to ignite the bags. There were no roof ventilators from which sparks may have been blown into the van.

(iii) The van was not occupied by any R. M. S. Sorter or Peon who might have attempted to do some cooking on a sigri or stove or dropped a burning cigarette to start the fire. The van was so fully loaded with mails that if either fire or cigarette were needed these would have been used in one of the following vans from where no fire could have been blown to the leading end of the leading van.

(iv) The evidence is unanimous that the lights in the van were all alight when the fire was discovered and continued to remain alight so the fusing and short-circuiting of any electric connection could not be the cause of the fire.

6. With regard to the salvage of the mails and the efforts to extinguish the fire the evidence agrees that :—

(i) The R. M. S. and train staff took prompt action on the discovery of the fire to bring the train to a stand and to detach and isolate the burning vehicle.

(ii) After the burning van was cut off and isolated every effort was made by both Railway and R. M. S. staff to extinguish the fire and save the mail bags.

(iii) The train and Postal vans carried their full complement of chemical fire-extinguishers and tools for breaking into a coach. Further the extinguishers were in good order and were used intelligently through the broken windows to play on the fire inside.

(iv) In addition to the chemical fire-extinguishers with the train, the Railway staff called on the engines of passing trains to help with water from their tenders in extinguishing the fire. Locally there were available a station well some 200 yards away and the private buckets of the Station Staff.

(v) No mails were retrieved and no attempt was made to extinguish the fire till the burning van was detached and that is till about 20 minutes after the fire was first discovered.

(vi) After the departure of the train at 2 hours the efforts towards further salvage of the mails rather languished for an interval of 6 or 8 hours though even after this interval 16 bags of unburnt and partially burnt letters were rescued from the debris.

(vii) In the debris and ashes after the fire and heat subsided were found an iron tea-strainer with wooden handle burnt and a porcelain "Souvenir from Leipzig Fair". This "Souvenir" on the outside was marked with ash but on the inside was blackened by a heavy deposit of what appeared the residue of exploded or burnt chemicals and might well have been gunpowder. It was found in the ashes by the Divisional Transportation Superintendent, Bhusawal, on 17th December and given over to me by him the same evening.

7. **Conclusions.**—I consider that there can be no doubt that the fire was not caused by either a spark from the engine, a heated bearing, carelessness on the part of the R. M. S. staff or finally a defective electric connection in the van.

The actual cause of the fire can only be guessed at. At the end of my enquiry, to the representatives of the Police and Magistracy, I gave it as my opinion that the fire was started probably by the chemical action of the contents of a package in one of the mail bags and that, although the contents of all packets may in themselves have been harmless, in the unloading at Bombay two or more packets may have been burst and it was the combination and coming together of two or more samples of chemicals that set up the fire.

8. I am supported to some extent in this theory by the following facts, but disclaim any real knowledge of chemistry :—

(i) The fire started from the bottom of a pile of mail bags in a closed van and, to ignite and burn quickly as it did, it could only be a chemical fire where the chemicals created their own oxygen or could burn on very little oxygen.

(ii) The volume and density of the smoke and yet the rapidity of the destruction, to both of which all witnesses bear evidence.

(iii) The subsequent finding of the 'Leipzig Souvenir' and its appearance. I had thought of sending this for chemical examination to Alipur but have refrained as there would be delay in my report and as far as I could see no useful purpose served.

I see no reason to suppose that the fire was caused maliciously.

9. **Remarks.**—Both R. M. S. and Railway staffs acted with vigour and intelligence when they had collected their wits a bit, but it is regrettable that during that interval of some 20 minutes that elapsed between the stopping of the train and isolation of the burning van, no attempt was made either to—

(i) retrieve some of the mail bags from van No. I by pulling them through into van No. II *via* the corridor, the fire being still at the further end of van No. I, or

(ii) to use the 'Minimax' extinguishers available in the vans to play on the fire in No. I van through the corridor or a broken window.

10. After the departure of the train too, water to extinguish the fire was requisitioned from passing engines and buckets of the station staff were used for water from the well which are reported to have done little good because the burning van could not be approached on account of the heat. It is a pity that the hand fire-engine from Harda goods shed 4 miles away was not requisitioned. Had this been done by a live Station Master at Charkhera or Harda, I am of opinion that considerably more than 16 bags of letters would have been recovered after the fire was extinguished.

4. HIS EXALTED HIGHNESS THE NIZAM'S STATE RAILWAY.

No. 35 Up Passenger train running into a motor lorry at a level crossing at mile 31/13-14 between Shadnagar and Timmapur Stations on the 14th January 1937.

FROM MR. G. C. LAUGHTON, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 7, BANGALORE, LETTER NO. N.-37/3, DATED THE 2ND FEBRUARY 1937. (6877-T.).

Description of accident and locality.—On the 14th January 1937, at about 16-55 hours, No. 35 Up Passenger train, consisting of 5 bogie coaches, one 6 wheeled coach, two 4 wheeled luggage vans and a 6 wheeled officer's saloon, running in the order given and weighing in all about 173 tons and drawn by a 4-6-0 M. Class Superheater (B. E. S. A. type) locomotive with 6 wheeled tender, weighing 64 tons, collided with a Ford Lorry (4 cylinder Model A type) which was being used as a bus on a 'C' class unprotected level crossing at mile 31/13/14 between Shadnagar and Timmapur stations, Secunderabad-Dronachellam section. The lorry was struck amidships and thrown clear of the track to the east side and practically demolished. Of the 24 occupants of the lorry, all men, 9 were killed on the spot and 7 more succumbed to their injuries soon afterwards. The remaining 8 were injured to varying degrees, but at the time of my enquiry, were progressing favourably. The owner and driver of the lorry were both killed. The driver stopped his train, which was travelling at about 35 miles an hour down a 1 in 133 grade, in approximately 1,157 feet. First aid to the injured persons was rendered by the District Locomotive Superintendent, who was travelling in the Officer's saloon, and by the train staff, and they were immediately placed in the train and taken on to Secunderabad to the Railway Hospital where they arrived within 3 hours of the time of accident. The damage to the engine was slight and to permanent way *nil*. The train was running vacuum braked throughout.

2. The level crossing in question is one of many unmanned and unprotected 'C' class crossings on the Railway without gates, chains or even the white gate posts prescribed in the Railway Board's Specification for level crossings. It carries an unmetalled cart road connecting the Hyderabad-Mahbubnagar Trunk road, which latter runs parallel with the Railway and at this point only 200′ away on the north-west side, with the village of Nandigama (or Nandgaon) on the south-east side and continues on for about 5 miles in this direction to the Dargah of Jehangir Pir. The railway from Shadnagar (mile $36\frac{3}{4}$) to Timmapur (mile $27\frac{1}{2}$), mileages reckoned from Secunderabad, runs approximately north-east and south-west, the up direction being towards Secunderabad. The line is mostly on the straight but from approximately mile 32, 1,100 feet short of the level crossing, it is on a half degree curve right handed, which continues for 510 feet past the level crossing. Practically the whole of this curve short of the crossing is in cutting varying in depth from *nil* to about 10 feet. These facts together with a dump of cutting spoil, various aloe hedges and trees makes the visibility of the crossing and its road approach from the south-east very limited to the driver of an up train. Conversely the visibility of a train to the driver of a motor vehicle approaching from the south-east is also much restricted: the visibility from the road 80-90 feet from the crossing is *nil*, while at 77 feet a train can be seen when it is 324 feet from the crossing, and it was at this point that driver Eduljee states he first saw the lorry.

3. The gradients on the run from Shadnagar to the level crossing are mostly falling, starting with roughly 3 miles down 1 in 133, then short lengths of level, rise at 1 in 200, fall at 1 in 150, and rise at 1 in 133 follow to mile 32, from which point the line again falls at 1 in 133 to the scene of the accident. The sanctioned maximum speed on this section was 40 miles an hour (since raised to 45). The train was to time and

according to the guard took 10 minutes to cover the 5 miles from Shadnagar, so the driver's estimate of his speed when he first saw the lorry of 35 miles an hour is probably a correct one. The accident occurred at 16/55 hours in broad daylight on a fine bright sunny afternoon. What wind there was it blew from the north-east, *i.e.*, from the level crossing towards the train, but it was stated to be light.

4. **Evidence.**—It may be accepted without reserve that driver Eduljee was well on the alert. He had been on duty about 8 hours, but had had 12 hours previous rest. His District Locomotive Superintendent had been on his engine up to the previous station and was still on the train in his saloon. There is ample evidence that he sounded his engine whistle at various points on the run from Shadnagar and particularly when approaching the level crossing in question. He was well acquainted with the section, and though there was nothing to indicate to him that he was approaching a level crossing, he well knew of its existence. As previously mentioned he could not see a road vehicle approaching the level crossing from the south-east when it was 80-90 feet from the crossing, it only came into view at 77 feet and it was at this point that driver Eduljee states he first saw it moving towards the line. His engine was then 324 feet short of the crossing and he had no chance of stopping a train weighing 173 tons from 35 miles an hour down a 1 in 133 grade. He seemed somewhat diffident about his brakes, but to have stopped the train, as he did in 1,157 feet, was a very creditable performance and shows that his brakes were really in excellent order.

5. The 24 men who occupied the lorry were some of a large party of holiday makers, mostly employees of the Hyderabad Mint and Electricity Department, who had been out on an excursion since 3 A.M. on the day in question. There is overwhelming evidence that, shortly before the accident, the majority of them including the driver of the lorry had consumed large quantities of liquor at the village toddy shop at Nandgaon situated only a few yards from the level crossing. The driver of the lorry was unfortunately killed and can give no evidence on his own behalf, but it seems almost certain that he was not in a fit state at least to appreciate the dangers involved in driving his lorry over an unprotected level crossing. The evidence of Parasram Reddy, the Deshmukh of Nandgaon village, a man of some position as headman of the village and a man of age and experience, is important. He is an unbiased witness and he states definitely he heard the train whistle and warned the driver of the lorry of its approach. He also testifies to the condition of the occupants of the lorry including its driver. He is supported on this latter point by a Mission Preacher and the butcher, both independent witnesses. There is also ample evidence that the dead bodies recovered from the wreck of the lorry, smelt of toddy and there were signs of pots of toddy in the wreck. The evidence of Mahomed Ismail, the head peon, who organised the excursion, as to the quantity of liquor consumed is significant.

6. It is necessary now to turn to the question of the want of protection of the level crossing. Nandgaon is a large village and is situated close to the crossing. The road over the latter is unmetalled but is capable, at any rate in dry weather, of carrying motor traffic, but there is no regular motor bus service to the village. This, however, is not surprising as the village is only some two or three hundred yards from the main trunk road on which buses ply frequently. The daily road user over the crossing appears to be 2 or 3 motor vehicles and some 15 carts. This is however increased on certain days of the week and particularly in the month of Sankranth (January-February) to a daily user of about 30 motor vehicles and perhaps 50 carts. The normal train service consists of 2 passenger and 1 goods train each way during the 24 hours. As mentioned previously the crossing is one of many unprotected 'C' class crossings on H. E. H. the Nizam's State Railway which have not even got the white gate posts as required in the Railway Board's Specification. Though this had no particular bearing on this case, as the driver was familiar with the crossing, these white posts are a most useful reminder to drivers of trains that they

are approaching a crossing where danger may occur from road traffic. The absence of these posts has already been brought out in my inspection report for the current year. Although the Deshmukh of Nandgaon stated that an application had been sent some years ago for the protection of the level crossing by gates, I am assured by the Railway Administration that no such demand had been received. Such a demand would normally come through the Civil Authorities.

7. **Conclusion.**—Having considered all the evidence tendered and having carefully inspected the site, I have come to the conclusion that the accident was caused by the reckless behaviour of Mohammed Yusuf, driver of the lorry, while under the influence of liquor, in driving his vehicle on to the unprotected level crossing in face of the approaching train, without due care and after having been warned. Neither driver Eduljee nor any of the train staff of No. 35 Up Passenger can be held in any way to blame for the accident.

8. **Recommendation.**—Though the daily rail traffic is light and the daily road user is normally not great, this latter is liable to increase largely on certain occasions, and in view of the poor visibility both from rail and from road at the spot, I consider that gates and suitable flank fencing should be provided immediately at this level crossing.

9. Further in view of the fact that a number of level crossings on this Railway are below standard as regards equipment and some have poor visibility according to the list of level crossings, a comprehensive survey should be undertaken by the Railway Administration and the Road Authorities of all level crossings on the line with a view to taking any safety measures indicated as a result of such survey.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 30th September, 1937

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1. EASTERN BENGAL RAILWAY.

No. 157 Up Passenger train running into No. 170 Down Passenger train, standing on the loop line of Santoshpur Station, on the 16th August 1937.

FROM MR. R. B. SETH, B SC., M.I.E. (IND.), GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, LETTER NO. 1090/1010/84, DATED THE 17TH SEPTEMBER 1937. (7077-T.).

1. **Description of the Accident.**—At about 16-51 hours on the 16th August 1937, No. 157 Up Passenger train, Budge-Budge to Calcutta, collided head-on with No. 170 Down Passenger train, Calcutta to Budge-Budge, which was standing on the loop line of Santoshpur station. As a result of the collision one passenger had two of his ribs broken and twenty-four others, including three women, received slight injuries. The drivers of the two trains and three other Railway employees were also injured.

2. Both the trains were booked to stop at Santoshpur. Each of them consisted of a four-wheeler luggage van next to engine followed by four bogie passenger coaches with a four-wheeler luggage van in the rear, drawn by a tank engine running chimney first. The Up train had a 2-6-2 type engine and the Down train. 2-6-4 type engine. The total weight and overall length of No. 157 Up, inclusive of engine, was about 238 tons and 318 feet and of No. 170 Down 232 tons and 321 feet respectively. The vacuum brake was in operation on all the wheels of all the vehicles and on the coupled wheels of the engine of both the trains.

3. The force of impact could not have been very great, as not a single vehicle came off the track nor was the track damaged. Buffers, buffer beams and cattle guards of both the engines were damaged or broken. Buffers and headstocks of all the eight bogies were found bent or damaged and in some cases sole bars were also slightly bent. The damage to the engines and Coaching Stock is estimated at about Rs. 850 and Rs. 580 respectively.

4. There was no First-Aid Box in either of the trains. The injured, however, received very early medical attendance. A local medical practitioner arrived at the site within ten minutes of the accident and District and Assistant Medical Officers of the Railway within two hours.

5. The weather was cloudy but the visibility was good and the rails were not slippery.

6. **Description of the locality of Accident.**—The site of the collision was on the loop line at the down end of Santoshpur station yard. The actual point of collision being 503 feet from the centre of the station and 1,200 feet inside the Up Facing points.

Santoshpur is a non-interlocked 'B' class station about ten and a half miles east of Calcutta on the Calcutta-Budge-Budge Suburban section. It is connected by Neale's Token instrument and telephone with Akra in the down direction and with Brace Bridge in the up. It is also connected with Calcutta Control by telephone. The distance between Santoshpur and Akra is $1\frac{3}{4}$ miles and between Santoshpur and Brace Bridge $2\frac{1}{4}$ miles.

7. Santoshpur Yard consists of a Main line (line No. 1) and a loop line (line No. 2) with a properly isolated Mill siding taking off the loop at the up end of the Yard. There are platforms on both the main and the loop lines, and the Station building is on the platform on the main line.

Facing points are clamped and pad-locked for the reception of trains and are provided with point indicators of Semaphore type. The indicator at the up facing point is about 8 ft. above the rail level and that at the down about $5\frac{1}{2}$ feet. The down facing point is No. 1 and the up No. 3.

Signals at each end are—an Outer at the adequate distance and a single armed Home Signal at the facing points. Signals do not show on which line a train is to be received but as mentioned above tall Semaphore point indicators are fixed at the facing points. The Outer and Home signals are worked by levers and winches situated on the platform on the main line. In addition to this there are two starting signals at each end of the yard controlled by Neales' Token instruments.

8. The station lies on a curve of 2,700 feet radius, right handed for an up train. The curve starts from a point 503 feet inside the up facing points and ends at 548 feet short of the down facing points, so that both the facing points are on straight the track in between being on the curve. The line from the station limit of Akra to the tangent point of this curve is straight and is practically 'level', there being a fall of only one foot from Akra to Santoshpur at a grade of 1 in 1,000. Santoshpur yard itself and the line right up to Brace Bridge is on a level.

9. The driver of an up train approaching Santoshpur can clearly see the signals and also the tall semaphore point indicator at the up facing points from an adequate distance, but due to the curve he cannot see which of the two lines is occupied till he passes the tangent point, about 500 feet inside the up facing points. From this point, however, he can easily see whether the loop line is occupied or not.

The pointsman at the up facing points also cannot see definitely which of the two lines is occupied but he can clearly see the on-duty staff at the up Home signal lever and any hand signals given from that place. The staff at the station platform can clearly see the semaphore point indicators at the facing points and the hand signals exhibited by the pointsmen at these points.

10. To a man familiar with the lay out of the yard the fact that a down train is standing on the loop is, however, easily discernible from the up facing points, specially if the engine of the train is standng near the end of the platform, as was the case with No. 170 Down on the day of the accident as, (i) the red brick latrine on the loop platform, which is such a prominent feature, is obscured from the view of the train, (ii) the station name board at right angles to the platform stands out prominently by the engine of the train, and (iii) the engine and about three leading vehicles are clearly visible but neither the platform nor any movements of the passengers can be seen. On the other hand if a down train is standing on the main line, unless it is a very long Mixed or Goods train, the engine or leading vehicles are not visible from the up facing points being obscured from the view by trees and staff quarters, but a good broad side view can be had of the middle of the train and the movement of the passengers on the platform shows out very prominently.

11. Subsidiary Rule 37 (m) of the Eastern Bengal Railway lays down the rules for the reception and crossing of trains at a non-interlocked station like Santoshpur.

12. **Report and Evidence.**—The two trains No. 170 Down and No. 157 Up are not booked to cross at Santoshpur, but as on the 16th August 1937, No. 170 Down was running late it was decided to have the crossing at this station. The Assistant Station Master on duty, Babu Bimala Charan Banerjee, decided first to receive No. 170 Down on the loop line. He called up the pointsmen, Nakul Chandra Pramanick and Krishnadhan Ghosh, and gave them instructions to go to the down and the up facing points respectively. Pramanick was given line label No. 2 and Ghosh line label No. 1. No. 170 Down arrived at 16-47 and was received on the loop line. No. 157 Up arrived about 4 minutes later. All witnesses agree that the signals were lowered for this train and that when it took the up facing points they were set for the loop line.

Pointsman Ghosh has admitted that he set and locked the up facing points for line No. 2 (loop line) for the reception of No. 157 Up, and said that he set them for this line firstly because he had been told to do so by the Assistant Station Master and secondly because whenever there is a

crossing of trains at this station the up train is received on line No. 2. He has also admitted that he was given by the Assistant Station Master metal label for line No. 1 which he put in his pocket and did not look at till after the accident.

13. The Assistant Station Master, Bimla Charan Banerjee, has stated that he gave pointsmen, Pramanick and Ghosh, line labels and keys in each other's presence and their instructions in each other's hearing and that Pramanick was given line label No. 2 and was to go to points No. 1 and set and lock them for line No. 2 and Ghose was given line label No. 1 and was to set and lock the points No. 3 for line No. 1. Pointsman Pramanick's statement confirms this part of the evidence of Banerjee.

Banerjee has also stated that he saw the points No. 3 correctly set for line No. 1 on two occasions, first when the pointsman Ghose arrived at those points and exchanged signals with him (Ghose has stated that the Assistant Station Master did not acknowledge his hand signals) and again after the arrival of No. 170 Down and immediately before he ordered the lowering of the Home Signals for No. 157 Up and that he was present near the Home Signal level when the signals were lowered for No. 157 Up, this (lowering of signals for No. 157 Up), he stated, was done about a minute after the arrival of No. 170 Down. He has suggested, and the trend of his evidence is, that Pointsman Ghose, under the mistaken idea that No. 170 Down had arrived on line No. 1 changed the setting of the points No. 3 after the signals had been lowered for No. 157 Up. This is not impossible as there is no detection between signals and the facing points. but is highly improbable. If the pointsman Ghose had the points correctly set for line No. 1 up till the lowering of signals for No. 157 Up, and unlocked and reversed them afterwards under the impression that No. 170 Down had arrived on line No. 1, it is natural that before changing the points he would have looked carefully to make sure on which line No. 170 Down was standing. To a pointsman who has been two years at this station and was familiar with the layout of the yard it would have been obvious that the train was not standing on line No. 1 but on No. 2. He would have also in such a contingency looked at his line label to make sure. I do not accept the suggestion that the setting of the points No. 3 was altered after the signals for No. 157 Up were lowered.

14. It appears that the pointsman Ghose got the instructions and line label from the Assistant Station Master Banerjee, but did not pay much attention to them. He was under the impression that the up trains at the time of crossing are in all cases received on the loop line. The practice at this station has been such that he was liable to get this idea. In all cases of booked crossings at this station, the up train is booked to arrive first and seven minutes have been allowed for halt for these trains against one minute for other trains, both up and down, so that at the time of the booked crossings up trains were being relegated to the loop line and the down trains received on the main line to avoid detention. There was no rule to this effect but the practice was of long standing. With this idea in his head that an up train at the time of crossing is to be received on the loop line Ghose set the points for the loop. I do not think he worried himself to locate on which line No. 170 Down had actually arrived.

15. As regards the Assistant Station Master Banerjee, the following statement shows clearly how he was employed from 16-47, the time of arrival of No. 170 Down, as he personally received or despatched these messages and made entries in the train register :—

Santoshpur Train Register.

Down Trains—

16-47—Time No. 170 Down arrived from Brace Bridge.

16-48—Time 'Train out of Section' for No. 170 Down sent to Brace Bridge.

Up Trains—

16-47—Time 'Train entering Section' received for No. 157 Up from Akra.

16-49—Time 'Line Clear' enquiry asked for No. 157 Up from Brace Bridge.

16-49—Time 'Line Clear' received for No. 157 Up from Brace Bridge.

This shows that Banerjee was in his office at 16-47 to receive 'Train Entering Section' for No. 157 Up from Akra and could not have left the office before 16-49. He has stated that he was in his office at the time of the collision (16-51). I am of opinion that after receiving the 'In-coming' token from No. 170 Down at 16-47 he went in his office, got busy with train reception and despatch duties and did not leave the office till the accident occurred and hence could not have been present on the platform to personally satisfy himself that the points No. 3 were correctly set and to exchange hand signals with the pointsman Ghose before the signals for No. 157 Up were lowered. He had given the keys of the padlocks of the signals to Porter Moniruddin, who I think had them lowered. Moniruddin's statement that the Assistant Station Master Banerjee was present near the Home Signal lever when the signals were lowered for No. 157 Up is, in my opinion, made with a view to safeguard himself, so as to obviate any responsibility being attributed to him. The statement of Booking Clerk Hemendra Bejoy Mukerjee that he saw through the ticket window, when issuing tickets to the passengers, Assistant Station Master Banerjee waving his hand signal flag in the direction of the up facing points is rather vague and not much reliance can be placed on it. He appears to be a friend of the Assistant Station Master Banerjee.

16. Pointsman Ghose said that he came on duty at 18 hours on the day previous to the accident, *i.e.*, on Sunday the 15th August, and since then had been on duty attending to the facing points for all trains with off periods in between the train times. Though on the 19th August 1937, when his statement was taken, he did not put forward this plea, but later when recalled on the 2nd September he said that as he had been on duty for an unusually long period without proper rest or time for food he was tired and his brain was not very clear at the time of the accident.

17. The 'Staff Duty List' at this station issued in October 1936, provides for four pointsmen, three rostered as 'Continuous' with eight hours' duty each to attend to points and one 'Essentially Intermittent' with duties from 7 to 9-30 and 12-30 to 19-30 to attend to shunting of goods trains and to work under the orders of goods clerk or Line Jamadar. As this list did not provide any staff for 'signal duties', the Station Master, Santoshpur, Babu Charu Charan Banerjee, who was on sick leave on the day of the occurrence, protested in November 1936 and asked for a better roster with an extra man and pointed out that up till then he had been utilising three pointsmen on signal duties in shifts of eight hours each and one to attend to the facing points for all the trains. The extra man asked for was not sanctioned nor the roster altered. The Station Master has stated that with the full knowledge of his superiors he kept on to the old arrangement of three men on the signal duties classified as 'Continuous' and one on points duty, with duty from 0 to 24 hours, classified as 'Essentially Intermittent'. The duties were being changed over after a week so that every pointsman took over points duty once in four weeks. The change was being made on a Sunday.

18. The average distance a pointsman has to walk back and forth to attend to the facing points for a train at this station is about half-a-mile and he will have to come on duty about 15 minutes before the time of arrival of the train and leave about 15 minutes after its departure. There are 30 booked daily passenger trains and about 4 Goods trains passing through this station, of which 31 pass between 5-52 and 21-17 at an average interval of about 30 minutes; one passenger train at 22-29 and two goods trains

between 2-22 and 3-0. So that if a pointsman has to attend to the facing points for all the trains he will have to walk over fifteen miles a day (there are three or four crossings at this station); be continuously on duty, going up and down the yard and at times probably having to run from one end to the other without a single off period of even 30 minutes, right from 5-30 to 21-30, 16 hours at a stretch, then have to come again after an interval of about 40 minutes to pass the 22-29 passenger train and then again from 2 to 3 hours to pass the two goods trains. The only periods he can get off in 24 hours will be from about 22-45 to 2-00 and 3-00 to 5-30 a total of about six hours. It is unbelievable that any man did or could perform such a duty even for a day not to say for a week at a stretch. It is inconceivable that a duty like this would have been classified as 'Essentially Intermittent' and that the pointsmen would have accepted it and carried on for last two years or so. It appears, and there is a certain amount of evidence to show, that the facing points at this station were kept clamped and locked for the main line in contravention of Subsidiary Rule No. 37 (J.). I have noticed this myself on both the occasions I have been at this station. I do not think the points-duty pointsman used to go to attend the facing points when the trains were being received on the main line. It must have been in consideration of this practice that the Station Master classified the points-duty pointsman as 'Essentially Intermittent' and the pointsmen accepted this arrangement of duties and, I was informed, preferred it to three men on points duty as continuous workers and one on signal duty as Intermittent. The plea put forward by pointsman Ghose appears to me to be an after-thought, he, in my opinion, did not actually attend to the facing points for all the trains from 18 hours on the 15th till the time of the accident on the 16th August 1937.

19. Kuddus Khan, driver of No. 157 Up, said that he came to know from the position of the arms of the point indicator that his train was being received on the loop line, he took the turn out at 10 to 15 miles an hour and saw another engine standing on the line he was being received on when he was near the curve post (675 feet from the point of collision) and immediately applied the brakes completely destroying the 18″ of vacuum he had but was unable to bring the train to a stop, it rolled on and collided with the other train at a speed of 3 to 4 miles an hour and that his fireman could not apply the hand brake as he was busy with the injector. He also said that he had been on this section for 3 or 4 months and on this engine for four days only before the accident, that one of the vacuum cylinders of the engine had been blanked off some time back and he could not create more than 18″ of vacuum, he experienced no trouble due to this and had not booked any defect for repairs but found that this rake did not pull up as quickly as other rakes did and that he was cautious.

20. Sarjoo, driver of No. 170 Down, stated that he noticed No. 157 Up coming on the same line on which his train was standing when it was 5 or 6 bogies lengths away and its speed then was about 20 miles an hour, he could not judge its speed at the time of collision but his train was pushed back some 20 feet due to the impact, he had recreated vacuum after coming to stop.

21. P. N. Banerjee, guard of No. 157 Up stated that the train entered the loop at 10 miles an hour, that when his brake van had passed the facing point indicator by about a bogie length (this will be from 1,000 feet from the point of collision) he saw from the right hand side of his brake van the other train standing on the same line and just then the driver completely destroyed the vacuum and that before he could apply the hand brake the collision occurred.

Had the train No. 157 Up taken the turn-out at 10 to 15 miles an hour and the driver made an emergency application of brakes when about 675 feet away from the point of collision as stated both by the guard and the driver of the train, it could easily have been stopped dead in less than about one-third this distance and no collision would have occurred, there

would have also been ample time for the guard and the fireman to apply their hand brakes. I cannot, therefore, accept the evidence of the driver and the guard as to the speed and the time of application of emergency brakes. Even if the train was running at 25 miles an hour, the guard had about 30 seconds to apply the hand brakes from the time he said he could see the train to the time of collision, his failure to apply the hand brakes tends to show that he probably did not notice anything except at a very late stage, and hence not much reliance can be placed on his evidence.

22. The speed at which the engine of No. 157 Up took the turn out must have been very much higher than the permissible ten miles an hour. From the consideration of damage done as well as from the fact that after the impact the two engines were standing 30 feet apart (as measured before the engines were moved by Rai Bahadur A. K. Gupta, Divisional Superintendent, Calcutta), the speed of the train No. 157 Up at the time of impact could not have been less than 6 to 7 miles an hour. Even if the driver had taken the turn-out at 25 miles an hour and I do not think he was driving so rash and dangerously as to have taken at a higher speed, he should have been able, with the brake power he had, to pull up in less than 675 feet by an emergency application of brakes and not collided at the speed he did. The 'blanking off' of one of the vacuum cylinders of an engine has very little effect on the brake efficiency of a train worked vacuum braked throughout. The brakes on the engine and the carriages of No. 157 Up were otherwise in normal condition. Neither this driver nor any other had complained about them before the accident. Had they not been in good and efficient condition the driver would have certainly booked them for repairs. Driver Kuddus Khan has admitted himself that on the day of the accident he experienced no trouble in working the train. As to why he did not pull up in this distance of 675 feet can only be explained by his not having made an emergency application of brakes at the point he could see the engine of the other train. This is also indicated by the statement of Sarjoo, driver of No. 170 Down, that the speed of No. 157 Up was about 20 miles an hour when he saw it 5 or 6 bogies lengths (about 300 to 350 feet) away. Though it is difficult for a man to correctly estimate the speed of a train coming towards him, but from the circumstances of the case Sarjoo's estimate appears to be approximately correct. It appears that Kuddus Khan was not vigilant and did not realise the danger and did not make the emergency application of brakes till he had covered some distance from the point he could see the other train.

23. **Conclusion.**—In my opinion Pointsman Krishnadhan Ghose and the Assistant Station Master Bimala Charan Banerjee are both responsible for the accident. In the case of Pointsman Ghose, there has been gross carelessness and neglect of duty. He had the correct line label issued to him by the Assistant Station Master but neglected to use it as a guide and did not comply with the Eastern Bengal Railway Subsidiary Rule 37 m(ii). The Assistant Station Master Bimala Charan Banerjee is responsible because he handed over the key and permitted the Home Signal to be lowered before exchanging hand signals with Pointsman Ghose and satisfying himself that the points had been set according to his instructions, thereby not complying with the Eastern Bengal Railway Subsidiary Rule 37 m(iv).

24. The accident, in my opinion, could have been avoided had the driver, Kuddus Khan, taken the turn-out at the maximum permissible speed of 10 miles an hour instead of about 20 to 25 miles an hour and been vigilant. Even at the speed he was travelling he should have done better than he did. In the circumstances I cannot but hold him responsible for not averting the collision and of breach of General Rule 90 (a).

It must however be mentioned that the Time Table does not make adequate allowance for the speed restriction of 10 miles an hour over the non-interlocked facing points. For this run of $1\frac{3}{4}$ miles between Akra and Santoshpur, both non-interlocked, only four minutes have been allowed so

that the drivers cannot keep time without exceeding the speed limit. This, however, cannot justify a driver taking a turn-out at an excessive speed and not being alert and able to control his train.

25. **Remarks and Recommendations.**—This accident is one which would not have occurred had the station been interlocked. I recommend that, in the interest of safety, the present non-interlocked stations on busy suburban sections of the Eastern Bengal Railway should be interlocked or if funds do not permit, at least partially interlocked.

26. It is desirable that at non-interlocked stations, Home Signals should be detected through the respective facing points so that it may not be possible for pointsmen to alter the setting of the points after the Home Signals have been lowered.

27. Due allowance for speed restrictions should always be made in the Time Table so that drivers can keep to time without having to exceed the sanctioned speed limits. For the whole of the Southern Section of this railway the Time Table is such that a driver cannot keep to time without having to exceed the speed limit specified for non-interlocked facing points.

28. In 1929 orders were issued by the Railway Board that all trains carrying passengers should be provided with First Aid Boxes; as far as is known to me no suburban train on the Eastern Bengal Railway has yet been so equipped. The Railway Board's orders should be given effect to as early as possible.

29. The enquiry has revealed that—

(a) At Santoshpur the Hours of Employment Rules as well as General Rules were being infringed for the last two years or so. This needs investigation. Staff duty list and Rosters at stations should be examined to see that they can be worked to without infringing any statutory rules. The lower paid staff posted at Santoshpur for train passing duties was inadequate and the Roster defective.

(b) The engine 634 S.T.S. was being worked with its left vacuum cylinder blanked off. There was no record to show when, where and by whom this was done. The only record that could be traced was to the effect that the neck ring of this cylinder had been repaired on the 16th May 1937. It is not desirable that engines should be run for any length of time with one of the vacuum cylinders blanked off. Proper records of repairs done to engines should be maintained. Examination of Repair Books of both the engines concerned in the accident showed that the books were not properly kept; there is nothing in the books to show whether day to day repairs booked by drivers were being attended to or not, in many cases the repairs booked were not even initialled by the Shedman-in-Charge or any body else.

would have also been ample time for the guard and the fireman to apply their hand brakes. I cannot, therefore, accept the evidence of the driver and the guard as to the speed and the time of application of emergency brakes. Even if the train was running at 25 miles an hour, the guard had about 30 seconds to apply the hand brakes from the time he said he could see the train to the time of collision, his failure to apply the hand brakes tends to show that he probably did not notice anything except at a very late stage, and hence not much reliance can be placed on his evidence.

22. The speed at which the engine of No. 157 Up took the turn out must have been very much higher than the permissible ten miles an hour. From the consideration of damage done as well as from the fact that after the impact the two engines were standing 30 feet apart (as measured before the engines were moved by Rai Bahadur A. K. Gupta, Divisional Superintendent, Calcutta), the speed of the train No. 157 Up at the time of impact could not have been less than 6 to 7 miles an hour. Even if the driver had taken the turn-out at 25 miles an hour and I do not think he was driving so rash and dangerously as to have taken at a higher speed, he should have been able, with the brake power he had, to pull up in less than 675 feet by an emergency application of brakes and not collided at the speed he did. The 'blanking off' of one of the vacuum cylinders of an engine has very little effect on the brake efficiency of a train worked vacuum braked throughout. The brakes on the engine and the carriages of No. 157 Up were otherwise in normal condition. Neither this driver nor any other had complained about them before the accident. Had they not been in good and efficient condition the driver would have certainly booked them for repairs. Driver Kuddus Khan has admitted himself that on the day of the accident he experienced no trouble in working the train. As to why he did not pull up in this distance of 675 feet can only be explained by his not having made an emergency application of brakes at the point he could see the engine of the other train. This is also indicated by the statement of Sarjoo, driver of No. 170 Down, that the speed of No. 157 Up was about 20 miles an hour when he saw it 5 or 6 bogies lengths (about 300 to 350 feet) away. Though it is difficult for a man to correctly estimate the speed of a train coming towards him, but from the circumstances of the case Sarjoo's estimate appears to be approximately correct. It appears that Kuddus Khan was not vigilant and did not realise the danger and did not make the emergency application of brakes till he had covered some distance from the point he could see the other train.

23. **Conclusion.**—In my opinion Pointsman Krishnadhan Ghose and the Assistant Station Master Bimala Charan Banerjee are both responsible for the accident. In the case of Pointsman Ghose, there has been gross carelessness and neglect of duty. He had the correct line label issued to him by the Assistant Station Master but neglected to use it as a guide and did not comply with the Eastern Bengal Railway Subsidiary Rule 37 m(ii). The Assistant Station Master Bimala Charan Banerjee is responsible because he handed over the key and permitted the Home Signal to be lowered before exchanging hand signals with Pointsman Ghose and satisfying himself that the points had been set according to his instructions, thereby not complying with the Eastern Bengal Railway Subsidiary Rule 37 m(iv).

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2. GREAT INDIAN PENINSULA RAILWAY.

Derailment of No. 411 Down mixed train at mile 521½ between Warora and Majri Stations on the 17th September 1937.

FROM THE HON'BLE H T. DE B. BINGHAM, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, LETTER No. 2021, DATED THE 9TH OCTOBER 1937. (7127-T.).

1. **Description of the Accident.**—No. 411 Down mixed train left Wardha at 8-00 hours on 17th September 1937, its formation being, from front to rear, engine No. 429 D-4, 18 covered loaded wagons, three empty luggage vans, one empty horse box, two third class bogies, one third class luggage and brake and one 1st and 2nd class bogie. At 11-05 hours, information was received in the Divisional Office, Bhusawal, that the Guard of the train had arrived at Majri Station and reported that at 10-20 hours 15 covered loaded wagons, 3 luggage vans and 2 third class bogies of his train had been completely derailed and seriously damaged, and that the permanent way was torn up.

2. The nearest breakdown train (at Wardha) was ordered to the scene of accident, also the Ajni (Nagpur) breakdown train, which includes a 35-ton steam crane. The transhipment of passengers, parcels and mails at the scene of accident was possible during the course of the afternoon of September the 17th and orders were issued for the South Bound Grand Trunk Express to be held up at Wardha overnight, in order that transhipment between that train and the North Bound Grand Trunk Express could be effected next morning (North Bound Grand Trunk Express not being due at the scene of accident until about 5-30 A.M.). Arrangements were also made for the local passenger carrying trains to be transhipped at the scene of accident as far as possible consistent with repair operations and working of material trains.

Transhipment of the South Bound Grand Express on September the 18th was carried out at night, the N. S. Railway Authorities having provided a rake to work to Hyderabad and Madras from the south end of the accident. The North Bound Grand Trunk Express of the 18th was transhipped in the early morning of September the 19th into the rake which had arrived from Delhi as the South Bound Grand Trunk Express the previous night.

3. The Divisional Engineer decided that, as repairs to the damaged track would possibly take longer than the putting in of a diversion, he would start putting in a diversion as well as repairing the damaged track.

There had been very heavy rain a few days previously at the site of accident and the cess on either side of the line and surrounding ground is said to have been water-logged.

4. On Sunday, September the 19th, the Transportation Department was still removing damaged wagons from the track at the scene of the accident, but at 14-45 hours their work had to be stopped as the Divisional Engineer wished to disconnect the damaged original track and concentrate on linking in the diversion, work on which by this time was well forward.

5. With the withdrawal of the breakdown train and ballast and material wagons, packing of the diversion track was taken in hand, the line was tested with a light type engine, which then proceeded to Majri and brought the first train (412 Up) over the diversion at 18 hours on September the 20th.

6. Approximately 1,400 feet of track was damaged by the derailment and wagons were telescoped into one another, indicating that the train had come to a stop very suddenly. By good fortune neither passengers nor railway employees were injured as a result of this accident, and the reason why sabotage is unsuspected is that the engine of the train and the first wagon attached to it were not derailed or damaged in any way.

About 40 rail lengths of 82 lb. bull headed rails on pot sleepers were damaged, all the pots and tie bars being broken, and many of the rails thrown out of their jaws and bent. The approximate damage is estimated at Rs. 21,800.

7. **Description of the site of the Accident.**—The site of the derailment is in a low earth summit cutting on a 1 in 200 up grade for about $\frac{1}{2}$ mile proceeded by a down grade with level portions from Warora. The line is on the straight.

The site of the first derailment was clearly marked at mile 521/10 + 90 ft. for a wheel of a wagon most probably E. I. Railway wagon No. 53200 had apparently dropped inside the track marking the tie bar lug, and the other wheel had hit the outer jaw of the opposite pot and had broken it off. This derailed wagon probably pulled off the remainder of the derailed vehicles, and they were all pulled along for some distance, smashing the pots and tie bars, eventually ploughing right through the ballast and down into formation before stopping. The stop must have been very abrupt, as the rake telescoped to a marked extent, this telescoping throwing off other wagons which were not previously derailed, and causing most of the actual damage to the rolling stock, which, up to that time, had apparently continued upright.

8. (i). **The Evidence.**—The recorded evidence given to me by various witnesses at the enquiry is of very little value in determinating the cause of the derailment. The one person (Driver Braganza) who might have given some valuable information was either dull or was wilfully assuming stupidity to avoid committing himself. In spite of coaxing and cajoling he remained as close as the proverbial oyster. A most unsatisfactory witness. His evidence implies that his first intimation of the accident was a lurching from side to side and a violent jerk of his engine and he perceived that his vacuum was nil. I conclude therefore that he manfully continued to drag his train without noticing anything until the train parted and even then he went a further 260 feet. The train was dragged more than a 1,000 feet after the first derailment occurred. The lurch which he says he felt was probably caused by the final severing of the vacuum pipe and the general mêlê taking place behind him and not by some obstruction, which if there had been any, would by that time have been left about 1,000 feet behind him.

(ii) The Permanent Way Inspector's and the Sub-Permanent Way Inspector's evidence goes to show that the track had been systematically kept in repair and was in as good a running order as can be expected at this time of the year and after a heavy period of rain coupled with black cotton soil. They state that this spot and others on this section are bad spots and difficult to maintain.

He emphasizes the fact that very heavy rain had fallen during the past fortnight and that the ground was saturated and oozing out mud.

(iii) The Gang Mate and keyman who were near the site at the time merely state that the track was in good order and the mate says the train was going 'very fast'.

(iv) The Guard's evidence is not of much use and the Carriage Inspector and his staff, who examined every wagon after the accident, state that the only thing they could find wrong was one axle slightly bent out of true $\frac{1}{8}$th inch, of wagon No. E. I. Railway 53200, but that the axle bore fresh marks of a blow and so this damage might have been caused by the accident. This wagon had come loaded from Jaitu, on the North Western Railway.

9. **Conclusions.**—A summary of the facts which I have been able to ascertain is given below :—

(i) The derailment took place on the straight, on an up grade of 1 in 200.

(ii) The down grades, with short levels in between, from Warora Station to within ½ mile of site of accident enable trains to attain high speeds.

(iii) The point of derailment was clearly marked, as a wheel of a wagon had suddenly jumped off the line, to the right hand side facing the direction of travel, and the flange of the left hand wheel had struck the tie bar lug of pot while that of the right hand wheel had struck the outer jaw of the other pot, breaking it off completely, thus releasing the key.

(iv) There was no indication that the wheels had gradually mounted the rails, for the marks indicated a sudden deflection or jump to the right.

(v) The wagon, after derailing, smashed all the outer jaws of the right hand pots, so freeing the right hand rails for a considerable length, which either fell over, or were pushed outwards, thus allowing numbers of following wagons to derail.

(vi) The derailed rake showed signs of severe telescoping, which lifted some wagons off the line, so it is impossible to say definitely which wagon derailed first.

(vii) If wagon No. E. I. 53200 was the first to derail (as seems likely) it was dragged approximately 750′ from point of derailment. If wagon No. B. B. 18104 was the first, it was dragged approximately 1140′, of which 265′ had been run with vacuum completely destroyed due to breakage of draw bar of wagon No. M. S. M. 3928.

(viii) No obstacle was discovered at site which might have fallen on the rail in front of the first derailed wagon.

(ix) Any obstacle which might have been on line before the train came along would have been removed, or its effect felt, by the engine or leading wagon.

(x) The track at the point of derailment. and for several hundred feet before that point, was tested, and gauge was found to be ⅛″ tight, level practically correct, and alignment, packing and ballast section in average good order, and there were no signs of a depression in the formation, so the track therefore was in average good order. Actually at the point of derailment the right hand rail is reported to have been 1/16″ higher than the other, which might have had a slight tendency to prevent a derailment to the right, such as happened in this case.

(xi) It is stated that the Permanent Way Gang had packed the point of derailment on the previous day. and that they were working about 100 yards away on the Warora side at the time of the derailment.

(xii) The site of derailment is near the top of a cutting, which was provided with efficient side drains, and the tops of such cuttings should not generally give trouble due to settlement during heavy rains, as drainage is naturally good.

(xiii) There had been heavy rain for some days previous to the time of derailment, although no rain fell the day previous. It follows therefore that the formation was soft but not out of the ordinary for this time of the year.

(xiv) Wagon No. E. I. 53200 (suspected to be the first to derail), had its front axle partly detached and pushed back under its frame, due to the axle guard, or guards, failing.

(xv) **Deductions from the facts.**—There was no radical defect in the track which could account for this derailment.

(xvi) During the run from Warora Station to near the site of accident, trains usually attain their maximum speeds, and hence all rolling stock is subjected to the maximum stress, which would tend to show up any mechanical defects if it existed in a wagon.

(xvii) High speeds, or abrupt variations of speed, should not alone have caused this derailment, as the light empty vehicles Nos. S. I. 412,

M. S. M. EVP 2401 and S. I. EL 617, in front of the two heavy 3rd class bogies Nos. N. S. R. 125 and N. S. R. 55 would have been the first affected. The remaining wagons were loaded.

(xviii) The only possible single causes for such a derailment are :—

(a) An obstruction falling on the line.

(b) A track defect, such as a bad depression of the right hand rail or a bad kink in the alignment.

(c) Excessive speed coupled with abrupt variations of speed.

(d) A mechanical defect in a wagon.

As the facts seem to show that (a) and (b) did not exist, and that (c) is unlikely to be a sole cause, it would appear that (d) must have existed, and it is possible that the development of this may have been assisted by high speed on the run from Warora, coupled with the fact that the running on black cotton formation, such as exists from Wardha to Balharshah, is always somewhat rough about the end of the monsoon.

(xix) As the original derailment was to the right side it appears, as stated before, that wagon E. I. 53200 was probably the first to be derailed, as the two derailed wagons, Nos. E. B. 6423 and B. N. 7517, in front of it were derailed to the left side, although the left hand rail where they rested was intact, so they must have been lifted over it, and neither they, nor wagon No. B. B. 18104 were appreciably damaged or marked below, indicating that they had not been dragged any great distance, so the first two were probably lifted off the line by the telescoping which occurred, and the last by the jerk which occurred when the draw bar broke. The badly damaged condition of wagon No. E. I. 53200 would indicate that it had been dragged the maximum distance, and hence helps to confirm that it was the first to be derailed. Owing to the damaged condition of this wagon it appears impossible to verify if any mechanical defect existed before the derailment.

(xx) I therefore assign the probable cause of the accident to some mechanical defect in one of the wagons and any evidence there is tends to show the defect was in wagon E. I. Railway No. 53200.

I also consider that the train was travelling over the 35 miles per hour speed limit fixed for mixed passenger trains and that this fact was a contributory cause to the derailing of the defective wagon.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

which occurred during the

Half-year ending the 31st March 1938.

No. 23.

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1. NORTH WESTERN RAILWAY.

No. 44 Down Passenger train running into a motor lorry at level crossing mile 510/6 between Bahawalpur and Samasata on the 14th October 1937.

FROM MR. E. B. N. TAYLOR, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, LETTER NO. 70/T, DATED THE 1ST NOVEMBER 1937. (7143-T.).

Description of Accident.—On the 14th October 1937, at about 9-20 A.M., No. 44 Down Passenger train collided with Motor Lorry No. 731 B. W. P. at the "B" class manned level crossing at mile 510/6, between Bahawalpur and Samasata. Fourteen passengers of the Motor Lorry were killed and twelve injured, and the Lorry was completely wrecked. The engine cow catcher was damaged and part of the side panels of a luggage van and third class bogie were smashed and torn completely off the body. Five 3 Class passengers on the train were slightly injured (one man, one lady and 3 children).

2. **Description of locality.**—The lorry was running along the main road from Dera Nawab towards Bahawalpur. The road converges towards the Railway line at an angle of about 45 degrees. When about 200 feet from the Railway it takes a bend to the left of 45 degrees crosses the Railway line at right angles and then takes another bend to the right.

3. Where the road crosses the railway there is a "B" Class level crossing fitted with single leaf gates on each side. Three railway tracks are crossed in the following order by a car coming from Dera Nawab :—

(1) Bahawalnagar-Samasata Branch line.
(2) Bahawalpur-Samasata Down Main line.
(3) Samasata-Bahawalpur Up Main line.

The collision took place on the middle line *i.e.*, No. (2) above.

Trains on the Branch line No. (1) approach this level crossing on a long straight in both directions.

Up main line trains (No. 3) approach on a long straight.

Down main line trains (No. 2) on which the train concerned was running approach the crossing on a long flat right hand curve, which straightens out 400 feet before the crossing. Fast trains can be heard approaching quite 2½ minutes before they reach the crossing and are clearly visible on the curve about half a mile before the crossing.

4. The view of the track from the road is very good and road signs are in position warning motorists of the existence of the level crossing. At site I calculated for different speeds (also see para. 15) relative positions of cars and trains and am convinced that anyone driving a car could not fail to see an approaching train unless he were a particularly casual type of driver.

5. There is a single leaf 12 ft. gate on each side of this crossing and it takes a gate keeper between 45 and 60 seconds to close and lock one gate, walk across the tracks and close and lock the other.

6. **Summary of Evidence.**—In addition to 13 witnesses I obtained copies of the statements made by 10 injured persons to Mr. Hargobind Mehta, 1st Class Magistrate of Bahawalpur, on the 14th October 1937.

7. The first and most important point to be established is whether both gates were open, or one closed and the other open.

S. N. Kaul, Driver of the train, states definitely that the Bahawalpur side gate the only side that he could see was closed when he passed.

Ghulam Rasul, Constable, states that the first thing that he did after the train stopped was to examine the gates and he found the Bahawalpur side gate closed and the other open.

A. G. Lodhi, Guard, saw the Bahawalpur side gate closed and the other open, but this was 45 minutes after the accident.

Chhinku Ram, Luggage Guard, saw the same thing 20 minutes after the accident.

Sharfaya, Gate keeper (not on duty), saw one gate closed and locked and the other open when he came out of his gate lodge directly after the accident.

Mohd. Mustaq, Ticket Examiner, saw the Bahawalpur side gate closed and the other open very soon after the accident. Four outside witnesses certify to having seen the gate keeper close one gate and start towards the other gate just before the accident. These men are all cultivators who work near this crossing and may be interested parties.

8. Now as regards the evidence given by 10 of the injured people who were in the lorry

Of these 10—eight were passengers and the other 2 were the driver and his assistant.

Six passengers did not see whether the 2nd gate was closed or open. One stated that the 2nd gate was closed and one was doubtful at first but afterwards stated that the 2nd gate was closed.

The other 2 injured whose evidence was taken were the Lorry Driver and his assistant. The Lorry driver stated that both gates were open. The assistant in his statement said the first gate was open and made no mention of the 2nd but when questioned, said that both were open. These two may be considered as interested parties.

9. Summing up this evidence we get :—

One gate open, one gate closed.

Driver of Train, Constable; Guard, Luggage Guard and Gate-keeper (not on duty) the last three saw the gate some time after the accident; Gate-keeper (biased); four outside witnesses (probably biased in favour of Gate-keeper); 2 injured passengers of lorry.

Both gates open.

Driver of Lorry (biased); Assistant to Lorry driver (biased). All other passengers in the lorry say that one gate was open but they did not notice whether the other gate was closed or open.

From the above I am of opinion that one gate was closed and the other open.

10. The Gate-keeper states that he closed both gates for a goods train, then opened them to let two tongas through and then shortly after that closed one gate for No. 44 Down and was walking across to close the other when the lorry ran through and collided with No. 44 Down.

The timings of the through goods train on the 1st line from Bahawalnagar to Samasata, and No. 44 Down on the 2nd line from Bahawalpur were examined and calculation showed that the first part of the Gate-keeper's statement was correct and that the goods train must have passed the crossing 2 or 3 minutes before No. 44 Down reached there.

11. The following calculations made by me at site showing relative positions of lorry and train at different times are of interest. I stood in

the several positions indicated for the lorry and had the corresponding positions of the train marked out. In every case the train must have been clearly visible with a margin to spare for wrongly estimated speeds.

Lorry speed 12 miles per hour.

Train Speed 40 miles per hour.

Position of *Lorry* on road from point of collision.	Position of *Train* on track from point of collision.
180 ft.	600 ft.
150 ft.	480 ft.
120 ft.	390 ft.
50 ft.	180 ft.

Unless the lorry driver's attention was taken up by something else it appears impossible for him to have failed to notice the train.

I conclude from this that the lorry driver's attention was concentrated on the fact that the level crossing gate nearest to him was open and that the further one was closed. Instead of looking out for a train his mind was occupied with the course of action he would adopt to get past the crossing.

12. **Conclusions.**—I am of opinion that Bangal, Gate-keeper, was conscientiously attending to his duties. He closed the gates for the passage of the through goods train from Bahawalnagar. He was expecting No. 44 Down which was already 20 minutes late. After passing the goods train he saw the two tongas waiting to go through. He opened the gates and watched these tongas go through and very soon after suddenly realised that No. 44 Down was coming round the curve. He had time to close the Bahawalpur gate and was going across to the other gate when he must have seen the Lorry approaching. I do not believe his story that he waved his arms and shouted to the Lorry driver. The closed gate on the far side is clearly visible with a large red disc and the gate-keeper probably did not think that the lorry driver would be so foolhardy as to drive on to the track when the far gate was closed. It is probable however that he did shout to the driver when he realised too late that the lorry driver had made up his mind to cross.

13. The lorry driver in his evidence, when he stated that both gates were open, also said that it was past the time the train usually goes through and so he appeared to expect the gates to be open. When within a mile of the crossing he probably saw the smoke of the goods train that passed by. When therefore he saw one gate open and the further one closed he possibly took it for granted that the gate-keeper was in the act of opening the gates after the passage of the train. He obviously made no attempt to look out for a train. If he did he could not possibly have missed seeing it. He drove straight on to the crossing expecting to see the further gates opened before he got there. When he entered the first gate he could not help both seeing and hearing the train approaching. He still had 15 feet in which to pull up, but he probably lost his head.

There is also the possible alternative that the lorry driver did the foolhardy thing that I have known to be done occasionally. The public have the impression that gates are always closed longer than necessary. He may have deliberately gone through the first gate which was open knowing that once he got on to the track the gate-keeper would have to open the second gate and let him through.

14. I would not charge Bangal, gate-keeper, with neglect of duty. On the contrary I think he was conscientiously attending to his duties of protection at the crossing with the least possible inconvenience to road users. He misjudged the time available in this instance and was unable to close the second gate after closing the first.

15. The lorry driver was exceptionally careless. He passed a motor road sign, warning him of the Railway Crossing. If he had looked up and down the track he could not possibly have failed to see the train and he deliberately drove on to the track when the far gate was closed.

16. **The driver of the passenger train is not to blame.**—The lorry approached from the blind side of the engine. Even if he did see the lorry approaching he would have had no possible chance of stopping in time. The driver actually stopped 1,450 feet beyond the accident which considering the circumstances, was good. The only other remark I have to make about the Driver is that he should have been quicker off the mark in making arrangements to protect the up line after the accident G. R. 166 (d) & (e).

17. **Medical arrangements.**—I am satisfied that everything possible was done to relieve the sufferings of the injured. Doctor Mohammed 'Akbar, Railway Sub-Assistant Surgeon, Samasata, was on that particular train and he used his own medicine chest and the First Aid Box, carried by the Guard of the train.

Doctor Shivcharan Singh, Assistant Surgeon, Quetta, a passenger, also attended the injured.

Captain C. S. Ahluwalia of the 2nd Bahawalpur Light Infantry rendered a great deal of useful help.

18. A party of 2 N. C. O.s and 5 men of the 2/12 Frontier Force on their way from Sialkot to Chaman helped to collect the dead and wounded and loaded them into the train.

The dead and injured were brought into Bahawalpur Station within 1¼ hour after the accident.

19. His Highness the Nawab of Bahawalpur heard about the accident and came to Bahawalpur Station immediately by car from Dera Nawab and His Highness personally supervised the disposal of the dead, and treatment of the injured and had all the injured removed to the State Hospital at Bahawalpur. A great deal of useful and effective help was rendered by His Highness.

Col. Dewan Ali, the Chief Medical Officer of Bahawalpur State, attended the injured and now has them under his charge at the Bahawalpur State Hospital.

2. NORTH WESTERN RAILWAY.

No. 7 Up Mail train running into Up Stores Special train at Mirpur Mathelo Station on the 10th December 1937.

FROM MR. E. B. N. TAYLOR, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 4, LAHORE, LETTER NO. 72/T, DATED THE 5TH JANUARY 1938.

Description of the Accident.—At about 7-13 hours on the morning of the 10th December 1937 the Up Stores Special was being shunted from the Up Main line over a cross over into the relief siding. About two thirds the length of the train had entered the siding when No. 7 Up Mail entered the station on the Up Main line and collided with the Stores Special at the cross over.

The engine of No. 7 Up Mail cut through the Stores Special and demolished 7 wagons. The engine and tender of No. 7 Up Mail were derailed and badly damaged and the first coach of the mail was derailed but very slightly damaged. Both Up and Down main lines were blocked by the derailed engine and the wrecked wagons which were piled up around the engine.

2. The casualties were:—

Driver Bourke seriously injured.

Fireman Wells seriously injured, (he died later).

Fireman Gamoo slightly injured.

The damages amounted to: —

	Rs.
Engine and rolling stock	25,000
Permanent way	1,000
Railway stores	6,000 (approximately)

3. Mr. A. H. Ghani, Assistant Mechanical Engineer, Karachi Division, who was travelling on No. 7 Up Mail got into the engine cab by climbing over the wreckage and managed to pull Driver Bourke out into the open within 10 minutes of the accident. He then set about releasing Fireman Wells whose leg was pinned under wreckage which had mounted the engine cab. This took over half an hour. Mr. Ghani rendered First Aid and 2 hours later Messrs. Bourke and Wells were attended to by a doctor from Mirpur Mathelo town. Mr. Ghani also made personal enquiries from all passengers of No. 7 Up and satisfied himself that no one was injured.

4. The accident took place at 7-13 hours on the 10th December 1937. The Relief Train from Rohri (50 miles away) arrived at site at 11-15 hours and the Divisional Executive Engineer and the Divisional Assistant Signal Engineer arrived at the same time. The block on the down line was cleared and single line working introduced at 13-15 hours. I am of opinion that all these arrangements were made and work carried out in an efficient and expeditious manner.

5. The Karachi Mail (7 Up) which was involved in the collision suffered about 7 hours detention. Other passenger trains delayed were No. 43 Up passenger about 5 hours and 20 Down Sind Express about 7 hours.

The block on the up line was much more difficult to tackle and because of the dangerous nature of the work it was decided not to work at night and give the staff a much needed night's rest. The up line was cleared and double line working restored at 20-40 hours on the 12th December 1937.

6. **Description of locality.**—Mirpur Mathelo is an interlocked "B" class station on the double line. A cabin at the up end of the yard works all signals and the cross-overs at the end. The cross-overs at the down end of the yard where the collision took place are worked by ground levers at the points and are controlled by special keys locked in the station master's miniature frame.

7. The normal position of the cross-over No. 20-T, (where the collision took place) between the up line and the up relief siding is locked for the up main line with special key No. 53 in the miniature frame at the station master's office. When this special key No. 53 is removed for working cross-over No. 20-T the locking in the miniature frame prevents the station master from transmitting the up Home Signal key to the cabin for lowering up signals.

Conversely, when the up Home signal key has been transmitted to the Cabin, special key No. 53 cannot be extracted from the miniature frame. The interlocking of cabin levers and miniature frame was tested and found to be in perfect order.

The up line approach to the station is straight for over $2\frac{1}{2}$ miles from the outer signal but there is a curve between the outer and home signal. On a clear morning it is quite possible to see the outer signal from a distance of 2 to $2\frac{1}{2}$ miles.

8. **Summary of evidence.**—Up trains approach from Sarhad station and after arrival at Mirpur Mathelo leave for Daharki.

From the train register and the evidence I find that :—

(a) A. A. Up Stores Special arrived at Mirpur Mathelo at 6-47 hours.

(b) Before arrival of A. A. Up the station master had obtained line clear for this train to go on to Daharki.

(c) A note by the Station Master in the train register showed that from calculations made by him No. 7 Up Mail would be delayed if A. A. Up were allowed to leave for Daharki.

(d) At 6-50 hours the line clear for A. A. Up to leave for Daharki was cancelled.

(e) At 6-51 hours the station master gave line clear to Sarhad for No. 7 Up Mail to approach Mirpur Mathelo.

9. The Guard of A. A. Up stated that the Station Master met him on arrival and informed him that he would have to back into the relief siding to give way to No. 7 Up Mail.

Since line clear of A. A. Up was cancelled at 6-50 hours and line clear to No. 7 Up given at 6-51 hours it is obvious that they had from 6-51 hours till 7-13 hours (the time of the accident) *i.e.*, 22 minutes to back A. A. Up into the relief siding.

10. From tests and calculations at site this movement could have been done in 6 minutes provided the station master had worked to rules and had signals raised and home signal key transmitted back to him on arrival of A. A. Up. That movement which should have taken 6 minutes, or at most 9 minutes, to complete was not completed in 22 minutes. Calculations show that the train must have been backing for about

2 minutes, and if according to rules the key of the Home Signal was in the station master's possession, key No. 53 could have been extracted and points No. 20-T set in 1 minute 50 seconds. This leaves 18 minutes, and I do not believe the story that the Station Master and the Guard spent all this time merely waving signals to the Driver to back especially in view of the fact that this Driver backed his train at every station at which he stopped previously to enable stores to be unloaded at the most convenient site.

11. The delay, I am convinced, was due to the fact that the Station Master could not extract special key No. 53 from his frame, because the Home Signal key had not been transmitted back to him from the Cabin as required by the rules. A. A. Up was scheduled to go on to Daharki and No. 7 Up was expected and the Cabinman had received instructions accordingly. The same signals were to be used again for No. 7 Up after arrival and departure of A. A. Up and so the Cabinman set every thing and left his cabin.

12. When an alteration was made in the proposed programme, most of the 18 minutes were spent in endeavouring to get the cabinman on the phone and eventually sending a pointsman to find and instruct the cabinman to electrically transmit the up Home Signal key back to the Station. Meanwhile the Outer and Home Signals and most probably also the Warner and Starter were in the "Off" position. This fits in (and calculations show that the situation was quite possible) with the statements of the Driver and two firemen that they saw the signals "off" from a distance of about 2 miles away.

I calculate that the time that elapsed, from the moment the Driver passed the outer signal at 50 miles per hour till the moment of collision at about 10 miles per hour, was 46 seconds. In 46 seconds it is impossible for signals to be thrown back to danger, key No. 53 released and A. A. Up shunted to the point of collision. Therefore when the Driver of No. 7 Up Mail passed the outer signal that signal could not possibly have been "off". The driver in his statement made no mention of the position of signals when he passed them, being too ill to be cross-examined.

13. The Driver and firemen however were definite that they spotted the signals "off" when about 2 miles away. Calculations show that the time taken from that point to the point of collision must have been somewhere about 3 minutes 40 seconds.

Exact time, found by practical test, to put back signals to " on " and set points No. 20-T for shunting	1 m.	50	secs.
Time to shunt 50 vehicles over the crossing at 8 miles per hour	1 m.	44	secs.
Total .	3 m.	34	secs.

It is therefore quite possible that the signals were "off" when the train was 2 miles away and that immediately after they were seen by the driver they were put "on" again to enable the Stores Special to be shunted.

14. **Conclusion.**—I hold Driver P. Bourke of No. 7 Up Mail responsible for the accident as there appears no doubt whatever that when he actually passed the outer signal that signal was in the "On" position.

I am convinced however that, when No. 7 Up Mail was about 2 miles outside the station, the driver did see the signals "Off" and that these signals had been thrown back to the "On" position after he had seen them. The driver must have had quite 3 minutes to notice this change. This

particular train is one of the most important on the North Western Railway and every effort is always made to avoid the slightest detention to it. It is possible that because of this, Driver Bourke and his firemen having once seen the signals "off" took it for granted that no further change was likely to be made.

15. How it happened that Driver Bourke missed seeing the outer signal at danger I cannot understand, because the prompt and efficient action taken by him only 8 seconds after passing that signal indicates that he was fully alert. This action taken by him directly he saw the obstruction saved a much more serious accident.

16. There is no definite proof that there has been slack and irregular working on the part of Assistant Station Master Girdhari Lal, and Cabinman Jumma, but in the summary of evidence above I have explained why I have arrived at the conclusion that less than 4 minutes before the arrival of No. 7 Up Mail the signals were in the "off" position although the Stores Special was standing on the reception line for the Mail. I am convinced that Assistant Station Master Girdhari Lal has not been in the habit of working his control frame according to regulations and has allowed Home Signal keys to remain in the Cabinman's possession.

17. **Recommendations.**—The system of working is quite safe and nothing further is necessary to be done to avoid accidents from this cause —a driver inadvertently passing a signal which was set against him. I, however, suggest that the North Western Railway Administration draw the attention of all drivers to the fact that an unfortunate accident occurred because a driver spotted from a long distance away that signals for his train were "off" and failed to notice that the signals were put back to danger before he reached them.

3. EAST INDIAN RAILWAY.

No. 7 Up Howrah-Delhi Passenger Express train running into No. 212 Down Express Goods train at Bamhrauli Station on the 16th January 1938.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 348/XIII/38, DATED THE 24TH FEBRUARY 1938. (7201-T.).

Description of the accident.—On the 16th January 1938, No. 7 Up Howrah-Delhi Passenger Express train left Allahabad at 5-15 hours, the next booked stop being Fatehpore at 6-41 hours. The train consisted of HPS Engine No. 1179, 8 bogies and a dining car being in order from the engine as follows :—

1.	HPS Engine No. 1179.	
2.	Bogie No. 3760 TFLR .	(III Female, Luggage and Brake).
3.	,, No. 3728 T .	(III bogie).
4.	,, No. 5092 N .	(Inter bogie).
5.	,, No. 3550 FSQ .	(I, II and servants).
6.	Resturant Car No. 3035.	
7.	Bogie No. 3429 FCSQ .	(I coupe, II and servants).
8.	,, No. 3456 T . .	(III bogie).
9.	,, No. 3732 T . .	(III bogie).
10.	,, No. 3759 TLR .	(III, Luggage and Brake).

The train lost one minute on the first section and was travelling at an average speed of approximately 37·5 miles per hour. At Bamhrauli the second station from Allahabad, arrangements had been made to cross three trains as follows :—

No. 163 Up Goods berthed in Up Passing Siding.

No. 212 Down Goods to be received on Loop Line.

No. 7 Up Express to be passed through on the Main Line.

No. 212 Down Goods arrived on the loop line at 5-25 hours and as it was coming to a stand No. 7 Up entered the loop line from the east end and crashed into No. 212 Down. Both the engines of Nos. 7 Up and 212 Down were badly damaged and their crews injured. The Driver of No. 212 Down died of his injuries.

2. The first three coaches of No. 7 Up Express were damaged as follows :—

Engine tender telescoped into the first bogie No. 3760. The second bogie No. 3728 telescoped into the third bogie No. 5092.

The first two bogies Nos. 3760 and 3728 were all steel, and the third bogie coach No. 5092 wood and iron panels.

The wheels of the third bogie No. 5092 kept the track and the remaining coaches of No. 7 Up were unaffected and eventually drawn back to Allahabad.

Of the Goods train five wagons were completely smashed. One mounted the tender and the others were smashed and capsized over the main and loop line. The 6th wagon from the engine was slightly damaged but not derailed. The rest of the train was unaffected.

The original overall length of the damaged engine and vehicles was 358 ft. 3 inches and the subsequent contraction due to impact was 175 ft. 9 inches.

3. There were a number of casualties—7 people being killed, 8 seriously injured and 13 receiving minor injuries.

Of the killed three were passengers and four were railway employees, two of the latter were not on duty.

Amongst the seriously injured were 6 passengers and two railway employees.

Minor injuries were sustained by 5 passengers and 4 railway employees.

Other than the 6 engine crew all passengers and railway employees were travelling in the three smashed bogies.

All the injured received First Aid within a very short time.

First advice of the accident was received at Allahabad at 5-35 hours and the Divisional Superintendent with other officers immediately left by road arriving at the site within very short intervals between 6-30 A.M., and 7 A.M. The Divisional Medical Officer, Allahabad with Ambulances and Medical staff left Allahabad at 6-48 hours by Relief Train arriving at the scene of accident a few minutes after 7 hours. The Divisional Superintendent and the Divisional Medical Officer set up a First Aid Post and the injured were given immediate attention. Motor Ambulances were requisitioned by phone from the British Military Hospital and the Civil Hospital, Allahabad. The injured were evacuated to the East Indian Railway Hospital, Allahabad, by these motor Ambulances as also the Municipal Ambulance and one from the Aerodrome; this with the exception of—

(a) Maharaj Amar Singhji of Jodhpur. Lala Khushi Ram and wife,

who after receiving medical attention placed themselves under the care of Outside Practitioners.

(b) Seth Jhurimal, after being admitted into the Railway Hospital was transferred to the Civil Hospital for X-Ray facilities.

(c) Bindu, a Hindu widow, who after being admitted into the Hospital and after receiving medical attention refused to remain in the Hospital on religious grounds and so she was permitted to leave in charge of a Mohant who has his camp in Kydganj.

I am satisfied that everything possible was done for the injured and the dead.

Medical assistance also arrived from the British Military Hospital, Civil Hospital, Municipality and Aerodrome, by which time the injured had received attention from the E. I. R. Medical staff.

4. Arrangements were made to divert trains *viâ* Phaphamau at Allahabad and Cawnpore and transhipment for stations between Allahabad and Cawnpore was carried out. Through running was restored at 20-30 hours the same date.

The cost of damage amounted to approximately Rs. 1,21,000.

5. **Description of site of accident.**—The site of the accident is at mile $518\frac{3}{8}$ from Howrah on the Main line of the E. I. Railway. Bamhrauli is flanked by the Aerodrome on the south side at the west end; the Grand Trunk road running parallel to the line a short distance to the north.

Bamhrauli station is a two line rail level platform station with the Station Master's office situated on the north or the loop line side, approximately in the centre of the station. The lever frame working the signals is situated immediately outside the Station Master's office.

The track consists of 90 lb. RBS rails on the main line and the loop line 75 lb. DH rails with 1 in 12 crossing at both ends. The line approaching Bamhrauli is straight and practically level, actual grade being 1 in 2500.

There is a Right hand curve at mile 520-658 ft. to 521-2048 ft. west of Bamhrauli, R. 1.6440.

The Station is interlocked of the Bolt-lock type, and fully signalled. All signals and interlocking were in working order.

The system of interlocking requires that when admitting a train on the loop line the points at the trailing end are also set for the turn-out.

The single line block instruments are Neals Token. Telephone and Morse communication with the adjoining stations (Subedargunge on the east and Manauri on the west) is provided and a Control Telephone on the Allahabad-Cawnpore Section Control.

All instruments were in working order.

The normal strength of staff were on duty, which included two men for Fog Signalling.

Visibility was according to all evidences very bad, being about 20 yards only.

A clock is provided.

Train Signal Registers were entered up correctly upto the time of the accident. These registers were closed, certified and taken charge of by an officer immediately on arrival at approximately 07 ·00 hours, there had been no alteration or corrections in the same. Timings and other details agree.

Assurance registers were maintained which included assurance by men for Fog Signalling.

6. **Evidence and Conclusions.**—The actual point of impact is on the loop line and as near as can be estimated approximately 210′ inside the trailing switch of the Up crossover.

These switches were, as stated, set for the crossover while admitting No. 212 Dn.

The facing points were still covered by the last two bogies of No. 7 Up after the collision and therefore could not have been moved.

All signals were found to be at danger by those first reaching the scene of the disaster.

The lever frame was in good order and in no way defective. All signal levers were in the 'on' position. Of the two midway point lock levers No. 7 was in the reversed position holding the points in the up direction for the loop No. 8 for the down direction was midway, free.

The driver of No. 7 Up states that the Up outer was lowered and that the warner was at danger. He did not see the home signals at all. The same statement is made by his first fireman. The second fireman did not see the signals at all.

The guard of No. 7 Up states that immediately after the collision he went back to protect his train with fog signals and when doing so he noted that all the signals in the up direction were at danger. As a matter of fact with the point lock levers in the frame being in the position they were and the up lever being held in that position by the train standing on the points, not one of the up direction signals could have been lowered

If final and conclusive proof were required that none of the up direction signals were lowered it lies in the fact that the derailed and smashed vehicles of the goods train fell across the signal wires and pinned them

into the ground firmly. Even could the frame levers have been moved not a single signal arm could have altered its position. Had any arm been lowered at the moment of the collision it must have remained in that position afterwards and could only have been returned to danger by cutting the wire between the derailed vehicles pinning it down and the signal post. The only wonder is that the weight of the vehicles burying the wires into the ground did not cause the signal arms to droop. I am therefore satisfied that the driver of No. 7 Up passed his signals at danger.

7. The next point for consideration is as to why he did so. The entire engine crew state that they received no fog signals. The fog was very dense and there is no confusion of evidence about visibility not being more than a few yards only. Fog signalmen had been sent out since about 22 hours the previous evening. The railway subsidiary rule is that fog signalmen should be relieved every three hours but this I am told is because fog signalmen are usually recruited from the gangmen who have been working all day. In the present instance the fog signalmen are recruited especially for this duty and therefore have to work full duty.

It is a point for discussion whether fog signals were actually put down for ill-fated No. 7 Up or not. Again there is the usual confusion when attempt to check up is made by a tally of the fogsignals. This is the result of carelessness on the part of the station staff in maintaining the fogsignal register. The first clear item appears to be that each fogsignalman was sent out with 12 detonators. The first train to be signalled was No. 126 Down at 21-24. It would seem rational that the first Up train No. 413 Up at 21-49 would also have been fogsignalled. This, however, is not shown in the trains register, the first train shown to be thus signalled in the Up direction is No. 211 Up at 22-41. Other Up trains being 301 Up, 453 Up, 415 Up and 163 Up making five in all. The next train was 7 Up.

8. The driver of No. 413 Up states that he received fog signals at Bamhrauli. If this were so Deo Narain, the fogsignalman for up trains, must have fogsignalled six trains and thus have used up his dozen detonators, having none left for No. 7 Up. A second supply had been sent out to him and was received by him after the collision. He states that this full tin and two extra detonators were returned by him to the Station Master. If this were so he could only have signalled five trains using ten detonators only. Such being the case which five trains were they? They must have been the five already mentioned and neither No. 413 Up nor No. 7 Up received detonators.

The fogsignalman in the down direction, Mohan Lall, had only five trains to warn, he should therefore have used ten detonators only and returned two plus a complete tin of one dozen to the Station Master. Actually he returned thirteen only. He was subsequently sent to bring the balance from Deo Narain who had not returned from his post after the accident. From Deo Narain he brought back 13 although Deo Narain maintains that he returned fourteen. Did Mohan Lall get these fogsignals mixed up? Actually he returned 26 in all out of the four dozen sent out to the two directions, 22 did not come back. He should have used only ten himself in which case Deo Narain would have used twelve for six trains. Which six trains?

413 Up,	211 Up,	301 Up,	453 Up,	415 Up,	163 Up,	
or	211 Up,	301 Up,	453 Up,	415 Up,	163 Up,	7 Up.
						or

or did he use ten detonators only and omit to fogsignal either No. 413 Up or No. 7 Up? If such was the case why did he omit to signal No. 7 Up?

The guard of No. 163 Up standing in the passing siding was the nearest responsible individual in Bamhrauli station to the Up outer signals, he has stated that he heard No. 7 Up coming and heard the fog-signals exploded. In such a case Deo Narain could have had no detonators left over out of his first tin of one dozen. The Divisional Superintendent, Allahabad, after he had arrived at Bamhrauli went to the outer signals to meet the incoming relief train. The guard of No. 7 Up had placed 4 detonators to protect his train according to rules. The Divisional Superintendent informs me that though he was expecting the relief train and was listening for it the fog was so thick and audibility so bad that he could only hear one of the detonators explode and that only faintly. Yet it is known that all four of the detonators were exploded.

The guard of No. 163 Up was in his brake some 300 yds. inside the outer signals. The fogsignal post is 300 yds. beyond the outer signals. It was a cold damp night and the guard stated that he had his van windows and doors closed.

It is extremely unlikely that he knew whether any detonators had been exploded or not, though it is certain that he heard No. 7 Up pass.

9. Finally a thorough search has been made both by the police authorities and by the railway for detonator marks on the rails and for exploded shells. Fourteen marks have been noted and fourteen empty cases have been found. Of these four are known to have been placed by the guard of No. 7 Up in protecting his train. This leaves 10 only to have been placed by Deo Narain. He could therefore have signalled five trains only and did return fourteen of which one must have been lost in transit.

It seems therefore that the probability is against any fogsignals having been put down for No. 7 Up. Why?

The guard of No. 7 Up in his evidence leads to a possible reason for no fogsignals. He states that on asking the fog signalman the reply he received was that he had placed none as no signals were lowered.

The subsidiary rule of the East Indian Railway is that on a single line detonators are to be put on the line when a train is 'due or expected'. How is an illiterate fogging man to know when a train is due or expected? In his evidence he states that he put the detonators down when he heard the train coming. He admits running to and fro between the signal and the fogsignal post so as to see what the signal was showing. He admits that for the first train he put down the detonators because he saw the signal arm lowered. The same for the second train. After that he states that the fog got so thick that he could not see from any distance and therefore signalled a train with detonators when he heard it approaching.

There is evidently a good deal in what this man says about his trying to watch the signal and it would seem that he was using this indication to advise him as to whether a train was due or expected. This is borne out by the fact that the marks of the detonators placed on the line by him are considerably nearer to the signal post than to the fogsignal post. To his untrained mind this was evidently a sound procedure, he could not realise that he thus frustrated entirely the use of detonators.

10. In the circumstances I must accept the view that no detonators were put down for No. 7 Up. The fogsignalman either did not hear the train coming or was depending on the advice of the signal arm as to whether a train was coming. Driver Burke of No. 7 Up therefore gets the benefit of doubt, if there is any, in this respect.

In regard to the running of his train from the timings of the registers it appears that he was running well below his speed, only about 37½ miles per hour which might almost be termed cautiously. He very foolishly has stated that he saw the outer signal off and the warner at danger. Had he actually seen this he might have been considered to be really culpable as in such case he would have known that he was not running through the station unobstructed and must have slowed down to 10 m.p.h., maximum to take the facing points, if necessary.

It is perfectly certain that no signal was lowered and that he missed the outer signal as completely as he missed the home signal. Having crashed on the loop as he did, he knew that the warner could not have been lowered and is hoping to be believed that he did not run past signals. I have no doubt that he did, though unwittingly.

The red tail light of the train standing in the siding could have given him no indication of the outer signal as he must have already passed the outer signal post before he saw the red light.

11. **Finding.**—I find that the accident was caused by the driver of No. 7 Up running past signals at danger in a very dense fog owing to which he had entirely failed to see them. His speed was not excessive. I am of opinion that he did not get the benefit of a warning by fog-signals.

12. **Recommendation.**—That subsidiary rule 75(a) enforced by the railway be placed before a rules committee for reconsideration. It would appear to be advisable that detonators be kept on a track regularly throughout a fog and that in the event of their being exploded by a train leaving a station the fogsignalman should give the driver indication to proceed.

As an alternative, in these areas of heavy fog a ground indicator should be placed by the fog signal post operated by the Station Master to indicate to the fogsignalman when a train is due or is expected.

4. ASSAM BENGAL RAILWAY.

Derailment of No. 582 Down Goods train on a 3-40′ girder bridge, at mile 376·08, between Nailalung and Langcholiet on the 17th February 1938.

FROM MR. R. B. SETH, B.Sc., M.I.E.(IND.), GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, LETTER NO. 312/1010/85, DATED THE 23RD MARCH 1938. (7237-T.).

Description of the Accident.—At about 9·48 hours, on the 17th February 1938, whilst No. 582 Down through Goods, ex. Tinsukia to Pandu, was passing over 3-40′ girder bridge at mile 376·08, between Nailalung and Langcholiet stations, the engine and six vehicles next to it left the rails. The engine was thrown down the bridge, on the left hand side into the Nala 20 feet below, capsized completely and lay with chimney down and wheels up. The tender remained coupled with the engine and was lying inclined with its rear wheels supported on the side of the girders. The coupling between the tender and the leading vehicle, a four-wheeled loco rest van, was broken and the vehicle itself was thrown down the bridge on the right hand side, its body was wrenched off the underframe and smashed, the underframe lay about 10 feet away from the wreckage of the body with its wheels up. The second vehicle, an empty four-wheeled covered goods wagon, was also thrown below the bridge on the right hand side. The third, fourth and fifth were four-wheeled covered goods wagons loaded with Kerosine oil in tins. The third and the fourth were thrown down on the right hand side and capsized, the fourth having its end resting on the track; the fifth was in a capsized position on the left hand side and completely derailed. The sixth was a four-wheeled oil tank totally derailed and partially capsized. This vehicle was on the abutment of the bridge. The remainder of the train was on the rails.

2. The composition of the train was as follows:—

Engine YD/4 class, 2-8-2 type No. 224.
One four-wheeled Rest Van.
One empty four-wheeled goods wagon.
Three four-wheeled goods wagons loaded with Kerosine oil in tins.
One four-wheeled tank wagon loaded with Kerosine oil.
Nine Bogie Petrol tank wagons loaded.
One Bogie tank wagon loaded with Kerosine oil.
Three four-wheeled tank wagons loaded with Kerosine oil.
One six-wheeled tank wagon loaded with Kerosine oil.
One four-wheeled tank wagon loaded with Kerosine oil.
Four Bogie Petrol tank wagons loaded.
Three empty four-wheeled goods wagons.
One four-wheeled brake and luggage Van.
One four-wheeled Saloon of Dist. Loco. Supdt.

3. The weight of the train including that of engine was about 810 tons and its total length 985 feet.

The train was vacuum braked from end to end. The percentage of braked load to total was about 95 per cent.

4. The driver of the train was buried under the cab of the engine and his dead body was extricated with some difficulty about midday. The fireman and 'agwala' were badly scalded and injured. The spare crew, three in number, in the Loco. Rest Van were also badly injured. First Aid was rendered by the District Loco. Superintendent, Lumding, who was in the train, and the guard, from the equipment carried in the Brake Van.

5. The amount of damage to Rolling Stock is estimated at about Rs. 14,000 and to Permanent-way about Rs. 500.

The line was blocked for about 23 hours; it was cleared and through running resumed at about 8-50 on the 18th February.

The weather was fine and clear but the rails, where the sun had not touched, were reported to have been wet.

6. **Description of the locality of the accident.**—The accident occurred at the north end of 3-40′ girder bridge at mile 376.08. From Nailalung, the station in the rear at mile 381½, the line falls 138 feet to the site of the accident, and except for a short length of a little over quarter of a mile of an up grade of 1 in 150, with two level bits of about 500 feet on each side of this up grade situated between mile 379 and 380, the line is wholly on down grades of 1 in 150, 1 in 173 and 1 in 175. From mile 379 the down grade is in continuous length up to the site and about a quarter of mile beyond; the bridge itself is on a down grade of 1 in 175.

7. From a mile and a half back from the site of the accident the line is mostly in curves and cuttings. The curves are three in number all of 4°. The furthest one starts from about a mile and quarter away, is right handed for a down train and is about 1,200 feet in length, the line then runs on the tangent for about 1,000 feet turning into another right handed curve some 900 feet long, it is again straight for about 1,000 feet and then turns into a left handed curve 1,800 feet in length which ends about 660 feet short of the north abutment of the bridge which is on the straight.

8. **Report and Evidence.**—Evidence in this case is clear and not conflicting. Some of the sleepers on the 3-40′ bridge were being changed, the work was being done under caution order as permitted by the rules of the railway company. Babu Satish Chandra Mittra, walking ganger, who was in-charge of the work had issued the necessary message in this connection, and the Station Master, Nailalung, had issued a caution order to the driver of No. 582 Down. The line was protected by banner flags and two detonators. According to the walking ganger the banner flag was put up at a distance of 33 rails (39′ long) from the bridge and one detonator 10 rails (39′ long) away and the other 14 rails away from the banner flag. The actual distances as measured from the north abutment were, banner flag 1,248, the nearest detonator 1,638 and the farthest one 1,794 feet.

The sleepers on the girder were being changed by opening a rail joint about 10 feet from the north abutment and lifting up the rails, thus the continuity of the track, both in surface and alignment was broken.

9. The driver of the train, George Mackenzie, knew the section well, as he had been on this section as a driver for the last 9 years or so. He had received the caution order at Nailalung that the bridge was under repairs and that he should look out for the Engineering signals. His view was, however, obstructed due to forest, cutting and curves.

10. To find out at what distance could a driver or fireman pick out the banner flag placed in the same position as on the day of the accident, I, in company with Mr. Coltman, Loco. Superintendent of the railway, travelled on the same type of engine, YD/4, from Nailalung. It was found that at 500 feet a very masked view through foliage and at 300 feet an unobstructed view could be had of the banner flag from the left (Fireman's side), but from the right (Driver's side) only the right hand corner of the flag could be seen when the engine was almost on it. It was also noticed that had the flag been on the tangent point 1,066 feet further away (Nailalung side) the driver could have had a clear uninterrupted view.

11. It was noticed that for a considerable distance prior to the banner flag position all the number plates on the telegraph posts had been obliterated for re-painting and the driver could not, had he wanted to do so, get his position by these. The drivers, however, do not generally get their position from the telegraph number plates, which in any case they cannot see in the night, but do so from known land marks. It is, however, undesirable to have long stretches without telegraph number plates for any length of time and it would be advisable, when re-painting, only to obliterate alternate ones.

12. Of the two detonators placed on the line the farthest one presumably fell off the line. It was found after the accident lying on the ballast unexploded. The second one, 1,638 feet from the north abutment of the bridge, had exploded and according to Mizazar Rahman, fireman, had been heard by him and the driver. So the first 'sound' warning which the driver got was at 390 feet from the banner flag and 1,638 feet from the obstruction. He ran over the banner flag, torn pieces of which were found near the bridge. He could not pull up the train in this distance, though it appears he tried his best to do so; the handle of the vacuum brake on the engine was found in the position full 'on' when wreckage was examined. As the rails over the bridge were disconnected the engine heaved to the left and fell down the bridge and caused the six wagons to come off the track.

The speed at which the train was running could be gauged from a record chart which Mr. Fosberry, District Loco. Superintendent, Lumding, had in his carriage. From this, as well as from the timings of the guard, it appears that the maximum speed down the grades was near about 23 m.p.h. mentioned by Mr. Fosberry in his evidence.

13. The driver had reduced speed when he ran over the banner flag, the fireman stated that it was 10 m.p.h. at this time. Though this may be an under-estimate, it appears to have been not much greater. The walking ganger who was on the bridge stated that the speed of the train was about 10 m.p.h., when he first saw it coming towards him. The engine would then have been some distance way from the tangent point, probably some 800 feet or so from the bridge. It is very difficult for a man correctly to estimate the speed of a train coming towards him and he is generally liable to over-estimate. Probably the speed of the train was about 12 to 13 m.p.h. when the driver ran over the banner flag. From the way the engine lay and other considerations of damage, I am inclined to believe that the speed of the train when the engine left the rails was about 3 to 5 m.p.h. as estimated by the District Loco. Superintendent and the guard—probably nearer the estimate of 3 m.p.h., given by the District Loco. Superintendent.

14. The brakes were binding when the train left Manipur Road station after attaching the District Loco. Superintendent's saloon, it stopped outside the Up Outer signal and brakes had to be released.

According to Mr. Fosberry the vacuum brake was not defective, it was in normal condition, and the trouble at Manipur Road was due to the driver creating more vacuum than he could maintain. The vacuum in the engine is said to have registered 15″ and in the guard's van 8″ to 10″. On examination of the wreck it could be seen, as stated before, that the handle of the vacuum brake on the engine was in a position of full 'On' and also that one of the wheels of the fifth vehicle, A. B. Railway covered goods wagon No. 6402, showed signs of skidding. Corresponding evidence was found on the table of one of distorted rails, showing that the driver had made an emergency application of brakes and had skidded.

15. **Conclusions.**—The banner flag was at a place where it could not be seen by the Driver from an adequate distance. It was also placed 72 feet short of quarter of a mile required by the Rules. Only two detonators were placed and the farthest one was only 546 feet outside the banner flag. General Rule 72 lays down that at a point half a mile from the obstruction, three detonators, about 10 yards apart, should be placed. In my opinion, had this been done the driver would have had sufficient warning and the accident would not have occurred.

16. The Permanent-way Manual of the Railway Company, issued in 1929 for the guidance of the Engineering Department, stipulated as per Plate No. II, Figure 'C', that for works done under caution order, the banner flag should be put up at least quarter of a mile away from the obstruction and that three detonators, one rail length apart, the nearest one being 10 rail lengths away from the banner flag should be placed (the rails are supposed to be 30 feet long). This was not in keeping with the General Rule 72 and was superseded later on, in August 1934, by a new Plate, in keeping with this General Rule. Unfortunately this revision was generally not known. I took particular care to examine the Engineering staff in this matter. The Assistant Engineer, the Permanent-way Inspector, Lumding, and two or three walking gangers examined did not know the existence of this new plate and only knew the old rules. I saw the Permanent-way Manual of the Assistant Engineer, Lumding, but did not find therein the revised Plate II, Figure 'C'. All the Engineering staff, as far as I could make out, had been protecting the line according to the old rules by putting detonators at 10, 11 and 12 rail lengths (30 feet each rail) from the banner flag.

17. The walking gangers are neither supplied with a General Rule book, nor with a copy of Permanent-way Manual and as such their knowledge is from what they learn from the Permanent Way Inspectors or from general usage. It will therefore not be fair to hold the walking ganger, Babu Suresh Chandra Mitra, responsible for the infringement of General Rule 72 in so far as he did not place the detonators half a mile away from the obstruction. I, however, hold him responsible for—

(a) keeping the banner flag 72 feet short of the quarter of a mile required by the rules of the railway, and

(b) using two detonators instead of three.

18. With regard to para 17 (a) above, it is very doubtful whether this extra 72 feet would by itself had given the necessary safety.

With regard to (b), the explanation of the walking ganger is that as the distance between the two detonators was greater than the minimum required, he thought two would suffice. He should have used three, he had no discretionary power in the matter. However, had three detonators been placed according to the usual practice and had they exploded, the driver would have got the first audible warning at 1,680 feet instead of at 1,638 feet. This extra 42 feet of audible warning, in my opinion, would have had very little effect on the prevention of the accident.

19. The rules of the A. B. Railway relating to the automatic vacuum brake (*vide* Chapter X, paras. 528 and 529 of the Appendix to the Working Time Table), lay down that in the plains section the vacuum in the rear brake-van should record 18″ and that if for some reason it is less than 18″, but not less than 10″ and the defect cannot be rectified, the driver may inform the guard that he will work the train with this amount of vacuum only, but that whenever the vacuum in the rear brakevan is less than 15″ the guard must be particularly alert and ready to apply his hand brake. In this case, the vacuum brake in the engine was recording only 15″ and in the guard's brake-van only 8″ to 10″. For this long and heavy train, with the maximum permissible load of 55, the brake power was not adequate and not according to the rules of the railway. I am of opinion that had there been the full amount of vacuum as laid down in the rules, the driver would have been able to pull up in time and the accident would not have occurred.

20. A certain amount of responsibility must be laid on the driver. He not only ran over the banner flag but also failed to stop in the 1,248 feet overlap beyond. It was not a case of an unexpected emergent stop. He had received the caution order that the only girder bridge in the section, Nailalung-Langcholiet, was under repairs and that he should look out for the Engineering Signals. Being thoroughly acquainted with the section, as he was, he should have known that the place he was likely to meet with the Engineering signals was on the left-hand curve approaching the bridge and he should have had the train well in hand and been prepared to stop there. He had a heavy train and was on a down grade with rails wet and slippery in patches, but he must have been fully aware of this and of the brake power as he had been running under similar conditions for quite a long length before coming on to the banner flag. He should have taken full cognizance of these facts and reduced his speed accordingly before coming on to the curve prior to the bridge. Though he had reduced the speed but it was not low enough to enable him to pull up at the banner flag or in the 1,248 feet overlap beyond. He probably misjudged the brake power of his train.

21. **Remarks and Recommendations.**—In my opinion—

(a) Staff like walking gangers authorised to block the line should be supplied with copies of the Permanent-way Manual and the General and Subsidiary Rule book and should be periodically examined to see that they are conversant with the necessary rules.

(b) Whenever an important alteration in rules, like the one to Plate II is made, it should be seen that every one, to whom a copy of the Manual is issued, is supplied with the correction, and an acknowledgment should be recorded in the district office.

(c) Wherever the visibility is poor, the banner flag should be put up at a place, not less than quarter of a mile from the obstruction, so that the driver may have as long a clear and uninterrupted view as the configuration of the country will allow.

(d) In places where detonators are liable to be removed by outsiders or are not within the view of the man at the banner flag, a man should be stationed at the detonator with a red hand flag or red light.

(e) A stricter inspection of detonators appears desirable as probably the first detonator which fell off in this case had weak or broken clips and hence did not remain in position.

22. There are certain sections of line on the A. B. Railway both in the northern and southern section which, though classified as plains country, are really hilly sections and it is recommended that in such sections the Administration should make more stringent rules for train working similar to those made for hill section.

5. GREAT INDIAN PENINSULA RAILWAY.

Collision between No. 28 Up Allahabad-Bombay Express, an empty covered bogie wagon and the Engine of V-Up Goods train between Jukehi and Amdara Stations on the 19th March 1938.

FROM THE HON'BLE H. T. DE B. BINGHAM, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, LETTER NO. 552, DATED THE 31ST MARCH 1938. (7271-T.).

Description of the Accident and the Locality.—Jukehi and Amdara Stations are block stations on the Bombay-Allahabad length of the G. I. P. Rly., situated respectively 682¼ and 694½ miles from Bombay. The distance between these two stations is therefore 12¼ miles. The collision occurred between these two stations at about mile 685½, that is, about 3¼ miles from Jukehi and about 9 miles from Amdara.

An empty G. I. P. Railway bogie covered wagon (No. 19509) ran away from Jukehi towards Amdara at a time said to be about 22-20 hours but I suspect a time earlier than this. H-5 Type Goods Engine No. 2020 of V-Up Goods was at Jukehi, and, tender leading it chased after the run-away wagon in an endeavour to catch it up and bring it back to Jukehi.

2. According to the Block Register at Amdara, the Express left there at 22-23 hours and collided with the bogie wagon at about miles 685½, that is, about 9 miles from Amdara. It would appear the Express was travelling at a high speed when its engine (D-2 Mail-Express-Passenger Type No. 239) hit the empty bogie wagon throwing it clear off the track on its right hand side and then hitting the tender of the goods Engine, that is to say, the Express appeared to have two collisions, first with the empty bogie wagon and, having cleared this vehicle out of its path, struck the Goods Engine a short distance further on.

There is a falling gradient from Jukehi to Amdara (1-250, 1-400 and 1-800 to the site of the collision, and then 1-800, 1-600 and 1-1,000 onwards to Amdara). The gradient of siding No. 1 on which was placed the wagon will be dealt with later.

3. On the Amdara side of the collision, the line is straight for a mile before the express hit the wagon. On the Jukehi side of the collision, the line from Jukehi takes a right hand curve for about a mile, and then runs straight for the remaining 2¼ miles to the site of the collision. About the time of the collision a three-quarter moon was rising and the atmosphere is believed to have been clear. The engine of the Express was equipped with a searchlight and it has been established that it was alight correctly at the time of the collision.

The running time of the Express between Amdara and Jukehi is fairly fast, that is, from Amdara to Pakaria Road (closed station) the running time speed is 51·4 m.p.h., and from Pakaria Road to Jukehi 46·9 m.p.h. According to Amdara Block Register the Express passed through that station at 22-23 hours, or 2 minutes before time.

4. The undergear of the empty bogie wagon was badly damaged. The Allahabad end trolley was thrown clear off the wagon, while its Bombay end trolley finished up under the middle of the vehicle.

The front buffer beam of the Express engine was bent back. Its bogie truck was broken away and shifted back some feet under the framing of the engine. The front of the smokebox had been pushed in and the headlight was demolished. From what could be seen of the frame of the engine, the right patch over the boxes of the coupled trailing wheels had come partially adrift. The splasher had been so distorted that the reversing lever bracket had been raised about a foot inside the cab. The whole cab of the engine had been thrown forward and had completely broken the main steam manifold. This had caused a tremendous blow of steam into the cab, resulting in considerable scalding of those travelling on the

engine (Driver, Fireman, Augwalla and a Locomotive Contractor's Coolie,* who was irregularly travelling on the engine). The footplate of the engine was demolished due to the tender being forced on to the engine. The Driver had his leg trapped between the engine and tender stanchions on the right hand side of the engine and the Fireman had had a foot trapped between these two stanchions on the left hand side of the engine. The regulator was found in the closed position. The vacuum-brake handle was found right down, indicating vacuum being completely destroyed. The water-gauge glass protectors were broken, but the gauge glasses themselves were intact. Most of the undergear of the engine was demolished. The front end of the tender framing was so badly buckled on both sides that the tender boxes had come right clear of the journals. The undergear of the tender is also scrap, the dragbox being completely detached from the frame.

5. The Driver and Fireman of the Express died shortly after the collision. The Augwalla and the Contractor's Coolie, who were with them on the engine, had miraculous escapes; they were badly scalded, but their other injuries such as bruises and abrasions were slight.

It has already been mentioned that the Goods Engine had travelled from Jukehi towards Amdara with its tender leading. This engine was not much damaged and only the Amdara end first pair of wheels of its tender were derailed. The damage to this engine and its tender were slight (mainly to the tender), since after rerailment of the derailed tender wheels the engine and tender were shunted on their own wheels back to Jukehi.

The first vehicle No. 5369, had the leading pair of wheels of the leading trolley derailed. The remainder of the train came to a stand without derailment. The vehicles composing the Express were hardly damaged at all, in fact, the only damages worthy of mention were to the first vehicle and these were not serious.

7. It is remarkable, seeing the great damage to the express engine, that there was no telescoping and derailment of rolling stock. About 17 passengers were slightly bruised or abraised and these were attended to by the G. I. P. Railway Sub-Assistant Surgeon stationed at Katni, who along with Mr. Ablitt, Carriage and Wagon Officer, arrived early at the site of the accident with an engine, brake and the Officer's Inspection Carriage. This engine, brake and Officer's Carriage returned as soon as possible to Katni with the dead bodies of the Driver and Fireman and an Indian lady passenger (who was suffering more from shock than injury), also with the scalded Augwalla and Coolie (who were on the Engine of the Express at the time of the collision).

Any passengers who wished could have come to Katni by this engine, brake and Officer's Carriage, which was met at Katni by the G. I. P. Railway District Medical Officer (Dr. Chatterjee, F.R.C.S.), travelling by the Jubbulpore Accident Train with all necessary medical equipment. None of the passengers (except the Indian lady passenger), however, wished to come to Katni for medical attention, preferring to await (at the site of the accident) the arrival of the train, into which the passengers were subsequently transhipped and by this means they continued their journey. The Indian lady passenger on arrival at Katni was seen at once by the Railway District Medical Officer waiting at Katni.

The Satna Accident Train, in charge of the Satna Locomotive Foreman, was soon at the site of the accident. It is equipped with medical stores. The Satna Railway Sub-Assistant Surgeon accompanied this Accident Train and was thus able to augment the medical assistance at the site of the accident.

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* The cooly denies that he was on the engine but in the leading III Class compartment.

8. This enquiry resolves itself round three focal points :—

(i) The running away from Jukehi into the block section of the empty bogie wagon.

(ii) The entry into the block section of Goods Engine No. 2020, following the runaway wagon in an endeavour to catch it up and bring it back to Jukehi.

(iii) The action of the Driver of this engine in the block section before and after he saw the searchlight of the Express.

9. Jukehi is a 'B' Class Block Station, equipped with the E. I. Railway type of interlocking, installed before the G. I. P. Railway took over this length of line. At a 'B' Class Block Station Line Clear may be given, provided the line is clear (and is therefore kept clear) up to the Home Signal. No matter how modern the interlocking of a 'B' Class Station may be, provided the line between the Outer and Home Signals is not obstructed and these signals are at danger, there is nothing to prevent any points (for example, trap points) between the two Home Signals being in any position.

10. I will now discuss items (i), (ii) and (iii) of para. 8, which formed the focal points of my enquiry, as the actual smash was the result of the happenings at the Jukehi end.

V-Up Goods (hauled by Goods Engine No. 2020 involved in this case) arrived at Jukehi at 21-55 hours and was admitted on the Loop Line. Inside the brakevan in rear of this train on arrival at Jukehi was empty G. I. P. Railway bogie covered wagon No. 19509, booked to Jukehi for loading. This was the wagon that shortly afterwards during shunting operations ran away.

The engine went to the rear of the train *viâ* the Main Line in order to detach the brakevan in the rear and also the empty bogie covered wagon booked to Jukehi and to place the latter in No. 1 Siding.

There were, however, three four-wheeled loaded wagons already standing in No. 1 Siding booked in the Up direction from Jukehi to be attached to the train. The engine, brakevan and the empty bogie wagon therefore first drew these three loaded wagons out of No. 1 Siding and attached them to the rear of V-Up Goods still standing on the Loop Line.

11. The empty bogie wagon was then placed in No. 1 Siding. This completed the shunting of empty and loaded vehicles booked to and from Jukehi. The engine and brake van therefore, after placing the bogie wagon in No. 1 Siding, returned to the rear of the train to await the passage of No. 28 Up Express on the Main Line, as there was not sufficient time for the engine to proceed to the front of its train before the arrival of the Express, which was being given precedence.

For the engine and brake van finally to return thus from No. 1 Siding to the Loop Line, they passed over the closed derailing switch and Points No. 2 set for the Main Line. These points and the derailing switch are coupled and work in unison by one lever situated near Points No. 2.

Thus, when the engine and brake van had passed over the closed derailing switch and Points No. 2 set for the main Line, they were returned to their normal position (derailing switch set to derail a vehicle running out of No. 1 Siding and Points No. 2 set for the Loop Line).

12. At about the time the engine and brake van reached the rear of their train on the Loop Line to await the passage of the Express, the bogie wagon in No. 1 Siding was noticed by Muccadam Budhoo Durga running out of No. 1 Siding (which is not on the level but falls towards Amdara the average gradient of this siding being about 1 in 200 as against the maximum permissible of 1 in 400). The derailing switch being set to derail, this man was faced with the possibility of punishment for causing the bogie wagon to be derailed at the derailing switch, due to his not having properly secured the bogie wagon in No. 1 Siding when it

was placed there. In his evidence he states that Pointsman Kalloo shouted to him to set the derailing switch for the run-through position, but Pointsman Kalloo in his evidence stoutly denies this. On being asked by Pointsman Kalloo to set the derailing switch and after he refused to do this, he states that he sought corroboration from the Guard as to whether he should carry out this action. He states that the Guard gave him the necessary instructions and thereupon he closed the derailing switch.

13. **Conclusions.**—I am not prepared to accept Muccadam Budhoo Durga's statement concerning orders from Guard Kadam for him to re-set the derailing switch: What was probably working in his mind was that, if the bogie wagon got derailed at the derailing switch, he would get reprimanded or probably fined and it most likely flashed through his mind that if he closed the derailing switch he could easily bring the wagon to a stand still long before it reached the Main Line. As it happened he found that neither he nor anyone else were able to bring the wagon to a stand still.

14. It is clearly evident that the hand brakes were not in proper working order from the start and had very little effect, if any, in controlling the wagon. I come to the conclusion that Muccadam Budhoo Durga altered the position of the derailing switch on his own initiative. He is therefore to blame for the subsequent accident. He is actually in charge of the movement of levers, not the Guard.

This man has endeavoured to place the responsibility firstly on to Pointsman Kalloo and secondly on to Guard M. S. Kadam. I do not believe that Pointsman Kalloo asked him to turn over the switch and even if he did so the Muccadam is the responsible person for working these points and should not have been influenced in any way by him. With regard to his statement that the Guard Kadam gave him orders to do this, as I have stated before, I do not think the Guard did, but anyhow the Muccadam is responsible for the actual movements of points.

15. This disposes of focal point (i), I will now turn to the remaining points, namely, (ii) the entry into the block section Goods Engine No. 2020, following the run-away wagon in an endeavour to catch it up and bring it back to Jukehi; and (iii) the action of the Driver of this engine in the block section before and after he saw the searchlight of the Express.

We now turn to Driver Nicholas of the engine of V-Up Goods with his engine standing at the rear of his train awaiting the passage of the Express. He is witness No. 5. He gave his evidence in a clear and straightforward manner. He says that the Guard and Pointsman Kalloo came running towards his engine and said that the empty bogie goods wagon, which his engine had just shunted into No. 1 Siding and left there, was rolling away. and they urged him to set his engine in motion tender leading and chase off after the wagon into the section in an endeavour to catch it up. He had to make up his mind quickly. A Driver is not permitted to enter a block section unless he has the authority of the Assistant Station Master on duty by means of the authorised line clear (in this case a ball token) or an authority to proceed without line clear. Therefore to enter the block section on his own initiative would be breaking a very strict rule.

16. He appears to have felt that there was a chance of his being able to catch the wagon by some means perhaps by getting hold of its coupling, reverse and get back to the station before the Express could hit the wagon. He decided to take the risk and of course at the same time was risking his own life and those of others. His endeavour unfortunately failed.

It is for consideration whether he ought not to have realised sooner that he was on a forlorn hope and given up the chase and got back again as quickly as he could to Jukehi hoping that the probable collision with a goods wagon alone would be slighter than with his engine added to the trouble.

17. I must refrain from entering into the ethics of the case as my primary duty is to find out the cause of the accident and to fix responsibility and finally to make recommendations to prevent, if possible, a similar accident. I find therefore that Driver Nicholas, by entering a block section without proper authority and knowingly in the face of an oncoming Express, did thereby increase the severity of the collision. Furthermore, on first perceiving the headlight of the oncoming Express he did not immediately stop and proceed back as fast as possible and so avoid a second collision. I am certain he had ample time and could have done this.

18. As regards the Assistant Station Master, Mohamed Hussain on duty at the time of the occurrence, I place no blame for this accident on to him. The Guard was responsible for the direction of the shunting operations and at the time that these were being carried out the Assistant Station Master was busy handing out tickets. He states in his evidence that he became somewhat uneasy at the late return of the key from the Muccadam Budhoo Durga which would enable him to lower the necessary signals for No. 28 Up Express. He states that he looked out of the booking office window to see if any one was coming with the key and then he realised that the Goods engine, No. 2020, was no longer standing in the rear of its train on the Loop Line. By this time he had received 'Train Entering Section' Signal from Amdara. He thereupon left his office to make enquiries concerning the engine and was told by Brakesman Mohamed Qaiyum of what had happened. It was of course then too late for him to stop the progress of the Express, but as a precautionary measure he sent the Obstruction Danger Signal immediately.

19. I would draw attention in this report to the fact that Siding No. 1 is by no means level, nor even a 1-400 gradient. On being checked it was found that this siding has an average gradient of 1-200 towards Amdara. It varies from 1-470 to as steep as 1-100. This fact of course has added to the cause of the accident. As an experiment a wagon was placed at the same spot as the run-away wagon stood, and it was found that this wagon also started to roll towards Amdara. Another contributory cause is defective hand brakes to wagon No. 19509.

20. It should be mentioned that there is a dead-end siding taking off from Siding Nos. 1 and 2 and the normal position of the points leading on to this dead-end siding is for the dead-end. After the bogie wagon had been placed in Siding No. 1 and the shunting operations in this vicinity completed, Points No. 3 were not set for this dead-end siding according to the Station Working Orders. Had this been done the run-away wagon would of course have entered this dead-end siding. Muccadam Budhoo Durga failed to see that these points were returned to the normal position.

21. With regard to the behaviour of Guard Kadam, he appears to have got somewhat confused in his evidence when he says he went back to his train and saw the Muccadam tightening up the couplings. It is fairly certain that the Muccadam was somewhere in the vicinity of the Home Signals and Points No. 2. It is difficult to believe that the Muccadam could have been nonchalantly tightening up couplings at this time.

I do not hold Guard Kadam responsible for the accident but I am of opinion that he might possibly have been more alert and exercised a little more supervision over the shunting going on and in so doing might either have prevented the wagon rolling from the very commencement or else have given the Assistant Station Master on duty an earlier warning which might have enabled the latter to have sent out the Obstruction Danger signal in time to stop the Express at Amdara. Although I could not get any direct evidence to prove it, I am of opinion that valuable time was wasted by the Guard, Driver, Muccadam and Brakesman panicking and arguing as to what was the best course to adopt. There was a possibility that had immediate notice been given to the Assistant Station Master concerning the run away wagon, the Express might have been stopped at

Amdara. Shunting was finished some time just before 22-12 and the Assistant Station Master did not receive the Guard's message, *viâ* the Brakesman, till just before 22-27. The Express entered the section from Amdara at 22-23.

22. As to the question of the distance that No. 28 Up Express was away from the Goods engine when Driver Nicholas first saw the head-light, from observations taken at the site of the accident the Driver of the Goods engine should certainly have been able to see the head-light of the Express at least $\frac{3}{4}$ mile away, probably much more. He therefore should have had ample time to get back to safety.

23. As regards the headlight of the Express, we may accept that it was working but it did not appear to have helped the Driver and Fireman of that Express to see the run-away wagon ahead and which apparently came to a standstill just before the collision. The headlight was either not burning very brightly or else the engine crew were not keeping a strict lookout.

24. Pointsman Kalloo was responsible for the actual uncoupling of the goods wagon and the pinning down of the brakes in Siding No. 1. I accept his statement that he actually did put down the brake lever. His subsequent efforts to stop the run-away wagon by hanging on to it and jumping on the brake levers and sticking to it right up to the site of the collision is commendable and it has been verified that he did actually light a small bonfire on the track to endeavour to attract the notice of the driver of the Express.

25. **Recommendations.**—The following recommendations are made:—

(i) That greater care be exercised in seeing that the hand brakes of all goods wagons are in proper working order. This wagon was a G. I. P. Railway wagon and was non-interchangeable with other railways.

(ii) That the sidings at Jukehi be regarded to bring them within the maximum gradient of 1 in 400.

(iii) That the present system of Signalling and Interlocking on this old East Indian Railway Section should be brought more up to date.

GIPD—L60RB—13-9-38—470.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

which occurred during the

Half-year ending the 30th September 1938.

No. 24.

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1. EAST INDIAN RAILWAY.

Accident at Hardwar on the 15th April 1938.

FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 1, CALCUTTA, LETTER NO. 932/XIII/38, DATED THE 14TH MAY 1938. (7292-T.).

Description of Accident.—At about 9·35 hours on the 15th April 1938, while empty mela rake No. 9, was being placed in No. 4 mela siding, the rear bogie TLR No. 1987, ran through the buffer stop at the end of the siding and collided with the palisade fencing of a pilgrim enclosure in which a number of passengers were waiting to be admitted to the platform. The fencing collapsed and the vehicle penetrated about 12 ft. into the enclosure before coming to rest.

As a result of the accident 3 persons were killed and 39 injured of whom 5 subsequently died in hospital bringing the number of dead to 8.

The clear standing room of No. 4 mela siding was 980 ft. and the normal length of mela rake No. 9 was 825 ft. After the accident it transpired that 2 additional bogies had been attached to this rake at Lhaksar without advice having been given to Hardwar. With these additional bogies the length came to 1005 ft. or 25 ft. more than the clear standing room of the siding.

The engine was stopped at the fouling mark, but when it had reached that point the rear vehicle had been pushed 25 feet beyond the buffer stop and 12 ft. into the pilgrim enclosure.

2. **Description of site of accident.**—The siding at the end of which the accident occurred is one of a group of 4 dead end sidings used for outgoing mela specials in the direction of Lhaksar. This particular siding had a clear standing room of 890 ft. and terminated in a light buffer stop constructed from old 75 lb. rails with a sleeper cross beam. The base of the buffer stop was covered with a foot or so of earth. About 12 ft. behind the buffer stop was the iron palisading of a pilgrim enclosure.

The approach to the siding is on a double reverse curve and the view of the end of the siding is obscured from the engine by any vehicles standing on the adjacent line.

3. **Evidence.**—On the day of the accident a senior officer's joint enquiry was held at which the evidence of 20 witnesses was taken. At my enquiry, after inspecting the site of the accident, I called up the important witnesses who verified their previous statements in my presence. In some cases additional questions were asked and 2 additional witnesses, the Permanent Way Inspector and Inspector of Works were also questioned.

4. **Conclusions.**—From the evidence it is clear that there was no gunner, shunting porter or other member of the staff giving signals at the rear end of the rake. The only traffic staff concerned with the operation were the Yard Foreman and a shunting porter who were both on the engine.

The Yard Foreman Arjun Singh was responsible for the shunting movement and being on the engine at the time he must have been aware that no signals were being given from the rear of the train. I accept the statement of Mr. Loganey, Yard Inspector, which is supported by the Gunner, that he had issued instructions that the final placement of empty rakes in the mela sidings should be done under the supervision of the Yard Foreman without the assistance of the Gunner.

5. I am of opinion that the Yard Foreman was quite aware that the shunting was being done in an irregular manner in that there was no shunting porter at the end of the rake, and that he himself signalled the driver to back the rake until the engine reached the fouling mark, relying

on his knowledge that the siding was long enough to hold a mela rake of normal length and being unaware that two additional vehicles had been attached.

The shunting movement was carried out at normal speed and the driver was acting on signals received from the Yard Foreman. I do not therefore hold him in any way responsible.

6. The original plan of the mela arrangements show a passage separating two adjacent pilgrim enclosures, the passage being immediately behind the buffer stop and the enclosures on each side. Mainly to save fencing material this passage way was omitted, the area immediately behind the buffer being included in the pilgrim enclosure. Had the original plan been adhered to, the end vehicle after being forced through the buffer stop would have come to rest in the passage way instead of in the crowded pilgrim enclosure and probably little or no harm would have been done.

The buffer stop itself was a light rail structure with very little earth backing. The resistance offered was so slight that when the accident occurred the staff on the engine were quite unaware that anything untoward had happened. To erect a buffer stop of this sort within 12 ft. of a pilgrim enclosure shows definite lack of foresight.

7. To sum up : The accident was due to :—(a) Failure on the part of the Yard Foreman to observe proper precautions during shunting operations.

(b) The addition of 2 vehicles to the mela rake No. 9 without advice being given.

(c) The omission of a section of palisade fencing shown in the approved plan of the mela area.

(d) The inadequacy of the buffer stop.

The unfortunate accident occurred during about the busiest period of the Hardwar Kumbh mela when all staff were working at exceptionally high pressure.

8. After the accident everything possible was done to relieve the sufferings of the injured persons and the District Medical Officer, Moradabad, who was at Hardwar arrived at the site immediately after the accident and took charge of relief operations. All the injured were removed to the camp hospital at Hardwar, where first aid was administered after which all hospital cases were removed by special train in charge of a medical officer and compounder to the Dehra Dun Civil Hospital for treatment.

2. EAST INDIAN RAILWAY.

Derailment of No. 5 Up Mail between Muthroopore and Sankarpur Block Huts on the 7th June 1938.

'FROM MR. E. R. CASEMENT, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 1187/XIII/38, DATED THE 21ST JUNE 1938. (7334-T.).

Description of Accident.—At about 23·23 hours on the 7th June 1938, No. 5 Up Punjab Mail derailed at mile 191/13 between Muthroopore and Sankarpur Block Huts. The engine derailed to the left of the line and plunged down the bank which is 20 to 25 ft. in height, followed by the 5 leading bogies comprising brake van, Inter class bogie, postal van, upper class coach and dining car in the order named. The sixth coach was derailed of all except the rear pair of wheels while the remaining two coaches remained on the track.

The engine came to rest in an upright position at the bottom of the bank, the tender being thrown over on its right side. The four leading bogies were capsized to the left, the brake van which was fortunately empty, and the postal van being badly smashed. The fifth vehicle, the dining car, was canted at a considerable angle down the bank but not capsized. The Inter class coach overlapped the leading brake van but there was no telescoping.

2. A relief train with Assistant Engineer and Sub-Assistant Surgeon left Madhupur at 1-45 hours and arrived at the site of accident at 2-15 hours. The Chief Medical Officer and the District Medical Officer arrived by another relief train from Asansol at about 3·55 A.M. A military doctor who was on the train assisted in giving first aid and 8 British soldiers of the K.O.Y.L.I. rendered valuable assistance in extricating passengers from the capsized vehicles and assisting the injured.

I arrived at the site at about 8-15 A.M. on 8th June 1938 with the Chief Engineer.

3. The driver and one Railway Mail Service sorter were killed and 39 injured of whom 13 were Postal staff. Of the 39 only 3 were severely injured the remaining injuries being described as simple.

4. **Description of site of Accident.**—At the site of the derailment the line is double, the up track consisting of 36 ft. 90 lb. flat footed rail on wooden sleepers N + 2 with rail screws. The track is level with left hand curve of 10000′ radius and on a bank 16 to 25 ft. in height approaching a girder bridge of 1 span 60′ and 1 of 40′. Except for the section distorted by the derailment the track was found to be in good order in all respects.

5. **Evidence.**—As regards the actual cause of the disaster the statements recorded at my enquiry are of importance only in so far as they establish the fact that no material evidence at the site of the derailment was removed or disturbed, prior to my arrival and that of Senior Railway and Police officials.

The description of the track at the point of derailment given by the Guard of the train, another Guard who was travelling spare on the train, and a Sub-Inspector of police who was also on the train, as seen by them immediately after the accident, besides the description given by the Assistant Engineer and Permanent Way Inspector, who arrived about 2 hours later, agree exactly with what I found on my arrival at about 8-15 hours on the morning after the accident.

6. As only one rail on the left of the track was concerned in the derailment, the distortion and dislocation of the track beyond this point being subsequent to, and consequent on the initial derailment, I will confine my remarks to three rail lengths, i.e., Rail No. 1 that immediately behind the displaced rail, Rail No. 2 the displaced rail, and Rail No. 3 the rail immediately ahead of the displaced rail.

Rail No. 1 was exactly in its normal position in the track and up to the end of this rail there was no distortion. The fish plates at the forward end of this rail were removed and a pair of fish plates, presumably the same pair, were placed at right angles to and leaning against the end of this rail.

Rail No. 2 was on its side with the rear end about $3\frac{1}{2}$ feet outside its normal position in the track, the forward end being close up to the track. This rail was slightly bent and marks on the table of the rail indicate that at the time of derailment it was upright and close to the track and that the marks were caused by spring hanger bolts or other overhanging parts of the derailed vehicles. Near the forward end of this rail a second pair of undamaged fish plates was found. The rear end of Rail No. 3 had been struck with great violence, probably by the leading wheel of the engine, and the mark of the impact is clearly visible on the end of the rail. This rail was torn from its fastenings, twisted and broken into two pieces approximately 11 ft. and 25 ft. in length. The shorter or rear portion was carried forward about 100 ft. and thrown to the right of the track and the longer portion was thrown down the bank to the left nearly opposite its normal position.

7. The first mark of derailment on the sleepers was on the first sleeper ahead of rail No. 1. This mark was vertically below the position in which the wheel flanges would have been had the track been intact and indicate that the wheels dropped straight off the end of rail No. 1 without being deflected.

All the rail screws 30 in number, holding rail No. 2 to the sleepers, were removed. 23 of these screws besides 6 undamaged fish bolts were subsequently found on the bank to the left of the track.

There can be no doubt that the derailment was caused by the wilful removal of a rail from the left side of the track. This conclusion is agreed to by the Deputy Inspector-General of Police, C. I. D., Bihar.

8. An examination of the Guard's journal and station records indicate that the speed of the train was normal and the Guard's estimate of 40 m.p.h. at the time of derailment may be accepted.

The last train over the section was 225 Up goods train about 50 minutes ahead of 5 Up. The driver of this train saw nothing unusual but the fireman stated that he saw two men with lamps on the line near the site of the derailment. He did not mention the fact as it was nothing unusual to see men on the line.

3. SOUTH INDIAN RAILWAY.

Derailment of No. 11, Shencottah Passenger train between Ayyalur and Vadamadura on the 21st August 1938.

FROM LT.-COL R. E. GORDEN, M.C., R.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS. CIRCLE No. 7, BANGALORE, LETTER No. S.-38/506, DATED THE 12TH SEPTEMBER 1938. (7406-T.).

Description of Accident.—On the night of August 20th-21st, No. 11 Shencottah Passenger from Madras to Shencottah, a portion of which goes to Tinnevelly, was running on the Trichinopoly-Madura section. It left Ayyalur station punctually at 0-06 hours on August 21st. At about 0-11 hours while running at a speed of about 40 miles per hour on a curved embankment at mile 255/15-16 it plunged into a breach in the embankment and was wrecked with, I regret to state, serious loss of life. The night was cloudy and dark with slight drizzle and there had been heavy rain previously.

2. The composition of the rake was normal, as under :—

Engine No. M.-43, 4-6-0 type, superheater passenger engine and tender.

No. 1 Bogie Postal third and brake van, No. B.T P.11.

No. 22 Bogie third with lavatory, No. LT.19.

No. 3 Bogie third with lavatory, No. LT.122.

No. 4 Bogie third with lavatory, No. LT.169.

No. 5 Bogie third with lavatory, No. LT.114.

No. 6 Vestibule third and buffet, V.T.R.15.

No. 7 Bogie third with lavatory, L.T.93.

No. 8 Bogie third with lavatory, L.T.25.

No. 9 Bogie composite first and second, B.S.F.33.

No. 10 Vestibule luggage van bogie, V.I.6.

No. 1 was from Trichinopoly to Tinnevelly.

Nos. 2 and 3 from Madras to Tinnevelly.

No. 4-10 from Madras to Shencottah.

3. The vehicles had teak wooden bodies on steel underframes. Three had I.R.S. underframe, one I.R.C.A. and six were of pre I.R.C.A. standard.

No. of axles.

40 axles for coaches.

and 8 axles for Locomotive (Engine and Tender).

Weight of the Train.

	Tons.	C. W. Ts.
Weight of the Engine	58	15
Weight of the coaches	237	8
Total . .	296	3

Normal Load.—No normal load has been fixed for any class of engine for any section, but the maximum load for each section for each type of engine has been fixed, which is 11 bogies for trains booked at accelerated speed and 13 bogies for trains booked at passenger speed for this class of engine on this section.

No. and braking capacity of brakevans on the train.

Nos. 2.

Braking capacity—260 Tons B. T. P.11—120 Tons.

V. L. 6—140 Tons.

No. of vehicles braked. All the 16 wheels on the above mentioned two brake vans.

Besides, all the bogies coaches are fully equipped with vacuum brake which operates on all the wheels of the coaches.

Nature of the Engine Brakes.

Engine—Steam.

Tender—Vacuum and Hand Brakes.

No. of wheels braked by them.

Steam brake—All the six coupled wheels of the engine.

Vacuum and Hand Brakes.—All the six wheels of the tender.

Condition of the Brakes.—The brakes were in working order and vacuum on leaving Ayyalur was between 18 and 20 inches.

4. The engine and tender plunged across the main breach and capsized to the left, followed by the first and second vehicles, No. 1 being partly telescoped by No. 2. The third vehicles capsized to the right and held up the fourth. The fifth lay alongside the fourth and to the right of it. The sixth partly capsized to the right, while the last four vehicles remained on the track. The four undamaged vehicles, whose lights remained burning, formed a haven for the uninjured and slightly injured passengers.

5. The number of passengers in the train has been fairly accurately determined to have been about 200, of whom all but two were third class. There were two second class passengers and no first class. The third class passengers were fairly evenly distributed in the vehicles Nos. 2, 3, 4, 5, 7 and 8.

The first fireman was killed instantly, but the engine driver and the second fireman escaped with injuries and severe shock. In the postal van the three sorters had a miraculous escape and proceeded to salvage the mail. The fourth occupant, a porter, in this vehicle was killed. 23 persons were killed; 55 were seriously injured, of whom 9 died subsequently up to 21 hours on August 26th. 27 were less seriously injured and treated as out-patients and about 100 escaped uninjured or with slight injuries and did not receive subsequent treatment as far as is known. The guard and the under-guard and a travelling ticket examiner were uninjured.

The damage to locomotive and rolling stock is estimated at Rs. 82,000 and damage to permanent way Rs. 530.

6. Through communication was restored at 10-15 hours on August 25th, No. 168 Passenger being the first train to pass over the breached portion at 11-16 hours.

7. **Description of site.**—The accident occurred at mile 255/15-16 on a level section of track on a 4′-6″ embankment on a curve of 5280 ft. radius. This section of the railway was constructed in 1874-75 as a single line metre gauge track. The permanent way now consists of 60 lb. R.F.B. (S.S. 11-A) steel rails, 36 ft. long, on steel trough sleepers, 14 to a rail, or n + 2. laid in 1925-26. Sleepers have pressed up lugs, two distance pieces and 2 single way steel taper keys. The track is in first class order and is fully ballasted with stone. Super-elevation is normal.

8. From Ayyalur station at mile 253/18 the railway runs in a south-westerly direction to Vadamadura at mile 259 on a falling gradient of 1 in 220 from Ayyalur to mile 254/9, followed by 1 in 150 to mile 255/14 where there is a short length of level on an embankment from mile 255/14, to mile 255/16½ on which the breach occurred. The level portion continues through a shallow cutting to mile 255/19 followed by a falling gradient of 1 in 150 to mile 256/15 and by less steep gradients to Vadamadura.

The drainage across the track is from east to west.

At mile 254/20, about one mile from Ayyalur station, the railway crosses a stream by bridge No. 1277 consisting of 3 × 30 ft. open top girders. This stream flows from a jumble of hills some miles to the east and has a catchment area of 26·37 square mile.

At mile 255/10 is a 1 × 20 ft. girder bridge, No. 1278, across a small stream which drains a small horse shoe shaped catchment area of about 2 square miles in extent which lies behind an isolated hill, 1313, situated about half a mile due east of where the accident occurred. This is a small unimportant stream which ends in a tank 1½ miles to the south-west of the railway.

These two streams are separated by a low water shed crossed by the railway through a shallow cutting at about mile 255/5.

At mile 255/12-13 the embankment is pierced by a small culvert No. 1279, 3 ft. wide by 3′-3″ high, which takes care of local drainage flowing west from hill 1313.

9. I inspected the site of the accident on the early morning of August 25th and found that the embankment had been breached on the level portion by one major breach 40 ft. wide by 5 ft. deep and three minor breaches each 10 ft. wide by 3½ ft. deep over a distance of 202 feet at mile 255/15-16. The major breach was the nearest to Ayylur and caused the wreck.

The embankment is about 8 ft. high near the 20 ft girder bridge which is on the 1 in 150 gradient. From mile 255/14 the top of the bank is level and about 6 ft. to 4′-6″ in height. At mile 255/16½ the bank ceases and the track enters a very shallow cutting and crosses a low water shed on a level gradient.

A curve of 5280 ft. radius commences at mile 255/12 on the bank and ends at mile 255/17¼ in the cutting. Thus the breach occurred on the curved portion.

10. The flood which did the damage brought down with it quantities of brush wood and dried grass. The high level mark of the flood was readily visible on the trees and reeds; grass could be seen on the floor of the cutting and on the ballast.

Accurate level prove that the portion of the bank shown as level has slight variations and was probably lowest where the breach occurred. Curiously enough the ballast had been disturbed at this spot, mile 255/15-17, a week before, during lifting and packing of low joints.

An examination of the rest of the bank showed that water had not passed over or through it. The floor of the gatekeeper's lodge at mile 255/15 where the line is crossed by a cart track, was not flooded.

11. I had a contour line pegged out in the fields east of the bank at rail level and this showed the limits of the flooded area. The contour line ran roughly parallel to the bank about 400 ft. away. The area presumed to have been flooded included a hut in which two old ladies had been awakened by water entering the hut and flooding it to about 9 inches depth.

The railway at the accident site is paralleled at a distance of about 50 yards on the north-west or down stream side by a metalled trunk road. Prior to 1930 the roadway ran at a low level over an Irish bridge. This provided a rapid run off of flood water through the 20 feet and 3 feet railway openings. A plan of the original causeway is not available but by analogy with two existing causeway on the same road the approach slopes were probably not steeper than 1 in 24. Assuming that the bottom level corresponded with the sill level of the culvert constructed in 1930 and only extended for the width of the stream, *viz.*, 22 feet, the waterspread corresponding to the flood level on the up stream side of the road on August 20th would be 334 feet and the waterway corresponding to this would be $(334 + 22)/2 \times 6\frac{1}{2}$ or 1157 sq ft. In 1930 the level of the roadway was raised and a culvert with 3 vents of 6 ft. by 5 ft. was constructed opposite mile 255/13 with road level 7 ft. 6 in. above sill level. A spur bund from the railway embankment with top level above road level was evidently constructed at

the same time to turn flood water through the road bridge and to prevent it escaping further to the south-west where the road embankment is lower. As a result of this alteration flood water passing through the 20 ft. bridge and through the 3 ft. railway culvert flows into a pocket of low ground bounded by the road and railway embankments and by the spur bund and must escape through the road culvert which provides a waterway of only 90 sq. ft. In addition the road culvert has to drain off water flowing into the low area from the north east between the rail and road embankments. On the night of August 20th flood water headed up in this low area until it submerged the vents in the road culvert by 1·7 ft., *i.e.*, was 6·7 ft. above sill level. Flood water from the breached bank overflowed the road opposite the breach by 7 inches, the road being 2½ ft. lower at this point than near the road culvert.

I noticed that the floor of the 3 ft. culvert No. 1279 was at borrow pit level, *i.e.*, was below ground level and had a cushion of about 3′-6″. It bore an old undated high flood level mark which showed that it had previously been submerged by 1′-3″.

12. An examination of the fields to the east of the bank showed that the run off from local drainage from hill 1313 westwards had not been great. Where concentrated by guide furrows in the fields it had not topped a 9 inch bund and would have been successfully drained off by the 3 ft. culvert which had proved adequate since its construction in 1875. A village 200 yards east of the bank had not been flooded.

I next examined the 20 ft. girder bridge No. 1278. This bridge has a stone floor 13 ft. below rail level. An undated high flood level is marked at 3 ft. above floor level whereas the flood on August 20th rose to 6·75 ft. above floor level which corresponds very nearly with the rail level near the breached portion of the bank. The stream channel, which is normally dry, approaches the railway line at an acute angle from the north east, curves sharply to flow through the bridge at right angles and then continues in an westerly direction for about 120 yards till it strikes the road embankment which is 7 ft. above bed level. The stream then runs in a southerly direction along the embankment and turns sharply through the road culvert on meeting the spur bund projecting from the railway line at mile 255/13-14.

13. Above the railway bridge the left bank of the stream is 3 ft. high and is overgrown with bamboos and reeds. This bank was breached immediately above the bridge and the flood swept along the borrow pits towards the south-west along the up stream side of the railway bank. This bank shows no sign of scour. Unfortunately the escape of the flood water along the railway bank was prevented by the low ridge at mile 255/17 where the line enters the shallow cutting and the volume of water was far in excess of the capacity of the 3 ft. culvert at mile 255/13. Consequently the water headed up behind the bank in the pocket of low ground until it just commenced to flow through the cutting. At the same time it must have percolated through the cleaner ballast at mile 255/15-16 and commenced to scour on the down stream side. This scour finally caused the four breaches.

14. No evidence was produced at my enquiry as to the previous history of bridge No. 1278 although a thorough search for old plans and records was said to have been made. Subsequent to my enquiry the completion drawings of the bridge as constructed in 1875 and a completion drawing of the regirdering of the bridge in 1906 were found. These are most illuminating and show that the bridge was constructed with a natural floor of hard moorum over rock 14·8 ft. below rail level. The completion plan dated 1906 shows that this natural floor still existed and shows a high flood level 7·5 ft. below rail level. It appears therefore that previous to 1906 there was a flood of greater intensity than that on August 20th, 1938. This flood apparently passed without damage to the railway bank the formation level of which was a few inches above the flood level. As the flood occurred at a time when the road still dipped through the Irish bridge the run off in rear of the railway bridge was not restricted and so the flood was probably of considerably greater intensity than that of August

20th. At some time subsequent to 1906 a stone floor was laid on the natural floor 12·8 ft. below rail level thus raising the level of the stream bed above the bridge by 2 ft. No records showing when or why this stone floor was added have been found.

15. The river which passes through the 3×30′ girder bridge No. 1277 at mile 254/18, also experienced a record flood. The gate-keeper at the level crossing at mile 255/5-6 had his house on the bank of the river above previous high flood level. He had lived there and closed by for about 40 years and on August 20th his verandah was flooded for the first time.

The watershed between these two streams, which run nearly parallel for about half a mile before crossing the railway track, has been examined and no sign of flood water having spilled over into the smaller stream has been found. There are no large tanks in the catchment area of the smaller stream.

The only conclusion possible is that there was a sudden deluge in the catchment area of these streams unprecedented for at least 32 years. It would appear that a bigger flood occurred prior to 1906 and passed safely.

16. **Evidence.**—The driver and second fireman were still in hospital at Madura when I held my enquiry and after examining the other witnesses and reading the recorded statements, I decided that it was not necessary to examine these two men myself, except that I obtained the driver's statement regarding the efficient working of his head light and his estimate of the visibility.

The three postal sorters who were in the first vehicle of the wrecked train declined to attend my enquiry.

The order in which witnesses were examined was to a certain extent dependent on the magisterial enquiry which was also taking place at Ayyalur station.

17. I consider that all the witnesses were satisfactory and reliable with the exception of the travelling ticket examiner, who appeared to me to be unreliable and anxious to take as much credit to himself as possible. I consider, however, that he did take an active part in the relief and rendered valuable assistance. His evidence as to the number of passengers was nearly 400 which he subsequently changed to over 300. He was not aware that there were two second class passengers. He had only checked two carriages since leaving Trichinopoly and was travelling in the buffet carriage when the accident occurred.

The evidence of the gate-keeper at mile 255/14-15 was fairly good though he could not give a definite account of his movements subsequent to the accident. There is a suspicion that he did not sleep at his gates, but in the absence of definite evidence I give him the benefit of the doubt.

The evidence of the gang mate, the other gate-keeper, was excellent and I accept their accounts of the villagers' story though I was not able to examine these villagers.

I received every assistance from the Administrative and other Officers of the South Indian Railway. I have carried out two inspections of this railway prior to the accident and I was impressed by the high standard of maintenance and of operating efficiency.

18. **Conclusions.**—On the night of August 20th there was local rain at Ayyalur from about 19 hours to midnight which included a heavy thunder storm between 19-45 and 21-45. At Vadamadura there was heavy rain from about 20-45 to 21-15 and light rain after till about 22 hours. This rain was unusual at that period of the year and may have amounted to a total of 2½ inches at Ayyalur. There was fairly heavy rain on the 19th also and the rain gauge at Ayyalur showed that 3·2 inches of rain fell on 19th and 20th. No warning to expect heavy rain in this area was received by the South Indian Railway engineers. At 21-24 hours No. 6 Passenger train passed over the bank, which was subsequently breached and the engine crew noticed nothing unusual. There was fairly heavy rain and visibility about 80 yards. The electric headlight would have illuminated

the fields to the east of the bank while rounding the curve. It may be assumed that the driver and fireman were on the look out as this short level portion, in a $2\frac{1}{2}$ mile rising gradient of 1 in 150, is a land mark and carries a level crossing. It is therefore most unlikely that any serious heading up of water had occurred by 21-24 hours. At about 23-30 hours according to the gate-keeper at mile 255/5-6 the flood water was falling rapidly in the larger river at mile 254/20. As the catchment area of this stream is about 13 times larger than that of the 20 ft. girder stream at mile 255/10, it is highly probable that the flood in the smaller stream reached its maximum earlier and was of shorter duration than that in the larger stream.

19. From the first hand evidence of the gate-keeper at mile 255/5-6 and the gang mate it appears that a party of villagers, one of whom was related to the gate-keeper, state that they were returning from a fair near Vadamadura on the fateful night. They were held up by heavy rain and sheltered in a shed just short of where the bank was breached. They continued their journey soon after the heavy rain had ceased and soon came across water flowing 9 inches deep across the road. Knowing that there was no opening in the railway opposite this spot they looked towards the bank and by a lightning flash they thought they say the dark line of rails and sleepers suspended over a gap through which water was pouring. If this is so then the time must have been soon after 22 hours and the flood was already subsiding. It would appear that the flood came down with a bump soon after the passage of No. 6 Passenger at 21-24 hours and this train had a narrow escape. Had this train been involved in the accident the results would have been far less disastrous. The run through time between Vadamadura and Ayyalur is 12 minutes for $5\frac{1}{4}$ miles, so its speed was probably less than 30 miles per hour and the engine would have plunged into the small breach at the exit from the cutting. It is improbable that any passenger coaches would have capsized. I consider that in all probability the breach occurred soon after 22 hours. The villagers narrated their story to the gate-keeper about 15 minutes after the accident to No. 11 Passenger had occurred and again to the gangmate on the 21st morning. They do not appear to have realised their responsibility even then. On seeing the breach they appreciated that a flood must have occurred and set off to see to the safety of their own village situated half way to Ayyalur station. On their way to their village they had to pass near to manned gate lodges, but apparently did not think of giving warning about the breach. At about midnight they were returning from their village along the railway line in the direction of the breach to see to the safety of some relative and were overtaken by No. 11 Passenger. They are stated to have waved a lantern and shouted warnings to the train. No member of the train crew heard these shouts. Other villagers appear to have been abroad after the heavy rain looking to the safety of their cattle, but appear to have given no warning of floods to any gangmen who slept in nearby villages.

20. The driver of No. 11 Passenger states that he was drifting down the gradient from Ayyalur station at a speed of 40 miles per hour with his regulater closed. It was drizzling and visibility with his head light was about one telegraph post about 80 yards. When rounding the curve at mile $255/15\frac{1}{2}$ the engine plunged into the breach without warning. I accept his estimate of his speed. The accident as timed by the guard occurred at 0-11 hours. There is proof that the train left Ayyalur to time; evidence shows that the normal time taken by trains on the run to Vadamadura is the time allowed in the time table, *viz.*, 9 minutes for $5\frac{1}{4}$ miles and there is no necessity to exceed 40 miles per hour.

I therefore conclude that No. 11 Shencottah Passenger was wrecked at mile $255/15\frac{1}{2}$ at about 0-11 hours on August 21st while running at the normal speed of 40 miles per hour by plunging without warning, into a breach 40 ft. wide by 5 ft. deep on a curve of 5280 ft. radius on an embankment about 4′-6″ in height. The breach was caused by a phenomenal flood probably between 22 and 23 hours on August 20th.

21. The theory advance in some newspapers that the accident was due to some other cause and preceded the flooding and breaching and that passengers were swept away, may be discounted as evidence proves that the flood had already passed.

A theory advanced by one of the passengers in a letter to me, that some villager may have cut the bank to save flooding to his house, as this witness thought he saw spade marks on the bank, is possible but unlikely. The level attained by the flood would in any case have resulted in a breach and the accusation of sabotage may be dismissed.

22. The cause of the accident being apparent, I examined a number of witnesses to determine whether :—

(1) prompt and effective measures were attempted by the local railway staff to prevent the accident,

(2) the railway Administration are to blame for providing insufficient waterway, height of bank or protective works which would have prevented the breach, or

(3) they could be held to blame for not ensuring that such damage to the track would be discovered before an accident could result,

(4) the accident having occurred, if prompt and effective action was taken to render assistance to the injured and other passengers, and

(5) to restore through communication.

23. I am satisfied that no blame can be attached to the engine driver of No. 11 Passenger. Unfortunately the breach was on a curve or he might have had sufficient warning to slightly check his speed. The position of the vacuum brake handle indicates that he attempted to do so while the engine was plunging across the breach.

No railway servant appears to have been warned of the wash-out but if the story of the villagers is correct and they had possessed any sense of public duty no accident would have occurred.

24. There is a level crossing at this spot which was actually blocked by the 9th vehicle of the wrecked train. Had this crossing been double manned as it was prior to 1937 the breach would almost certainly have been detected by the night gateman and the accident avoided. This has been unduly stressed by the public. The level crossing serves a cart track leading from the trunk road to two small villages east of the railway. In 1936 an investigation was made in the interests of economy to reduce gate-keepers at unimportant crossings where the traffic at night did not justify manning the gates for 24 hours. This was one of the crossings where a reduction was made. The gate-keeper stated in his evidence that he only had to open the gates at night on two days of the week, Thursdays and Saturdays, and then only for a few carts returning from local fairs soon after sunset. I consider that the reduction was a legitimate one. The District Engineer is certainly not blameworthy in this respect.

25. What of the gate-keeper whose duty it was to remain in his lodge after locking his gates at 18 hours? He states that only two carts went to the fair on Saturday 20th August and both returned before dark. He sat in his lodge and soon fell asleep and was awakened by the crash of the accident. Unfortunately the flood rose just high enough to top the lowest portion of the bank and not high enough to flood the gate lodge and awaken the gatekeeper. There is a suspicion in my mind that the gate-keeper may have been absent from the lodge. In the absence of any definite evidence on this point he must have the benefit of the doubt. In any case it would have been a fortunate coincidence if he had discovered the breach and there is no evidence that any one attempted to inform him of it. As he was not supposed to be awake on gate duty he cannot be held responsible. The subsequent action of this gate-keeper shows him to be a timid person unable to rise to an emergency and perhaps unsuited for a gatekeeper's duties.

The gatekeeper at mile 255/5-6 was awakened by a call of nature and would have discovered a breach near his gate. His actions, if correctly reported, are praiseworthy.

26. The gang mate and coolies who have charge of this section of the track are not housed in gang huts, but sleep in their villages near by, as is customary on railways in South India. After a long day's work they go early to bed and were probably asleep by 20 hours when the heavy rain started. The mate is empowered to call out night patrols at any time. He states that when he fell asleep there was only light train. He appears to have given instructions to the gatekeeper near the larger stream to patrol the bank and watch the bridge during heavy rain. He appears to have had no anxiety about the smaller stream during the three years he had been mate in charge. There had been heavy rain the previous evening also without flooding and I do not think he can be blamed for not calling out patrols. He was awakened by the frequent whistling of the first relief train and went to see what was the cause.

27. The Permanent Way Sub-Inspector who lives at Ayyalur states that it commenced drizzling at 19 hours on August 20th after a sultry afternoon and there was an ordinary thunder storm between 20-30 hours and 21-30 hours; in this he is supported by the Assistant Station Master, Ayyalur, and the Station Master, though the period of heavy rain is given as 20—21-45 by the former and 20-40 hours to 21-10 by the latter. At Vadamadura the two Station masters agree that there was heavy rain from 20-45 hours to 21-15 hours. The rain is described as heavy but not very heavy. The driver and fireman of No. 6 Passenger describe the rain as a normal rain storm. None of these persons considered the rain to be so heavy or unsual as to cause them any anxiety or in the case of the station staff to warn drivers. The Permanent Way Sub-Inspector went to bed at 22 hours after the heavy rain and did not send out patrols though he had two gangmen living near the station. No. 6 Passenger had run through Ayyalur at 21-28 hours without making any report of flooding. No heavy rain warning had been received. He had never had occasion to patrol during the south west monsoon, nor had flooding occurred during the north east monsoon. As events proved, he committed an error of judgment in not sending out patrols, but in view of the freedom of this section from previous flooding I do not hold him seriously blameworthly.

There remains the question of the responsibility of the Administration in the provision of adequate waterway and height of bank which would have prevented the washaway, and alternatively a system of permanent patrols which would have discovered the damage to the track and avoided an accident.

28. The cost of providing night patrols is about Rs. 60 per mile per annum. It is the policy of all railways to keep such patrols to the absolute minimum necessary in the interests of safety and the use of permanent night patrols throughout the year must be very rare indeed. The South Indian Railway have an excellent system of night patrols which are obligatory in all weathers on certain sections of the system during certain periods of the year. These sections and periods have been carefully selected having regard to the periods of heavy rainfall and liability to flooding and are notified in their rules for patrolling. The previous history of this section of the system, as recorded in the Chief Engineer's office since the line was constructed in 1874-75, shows no previous flooding or wash out at this spot. The value of this negative information is enhanced by the fact that minor wash-outs at mile 253/13 and at mile 260/11 are recorded. The first occurred in October 1877 and the second in October 1878. The section of the track involved in the accident does not lie definitely in either the south west or north east monsoon area, but being east of the Western Ghats it is more liable to rainfall in the north east monsoon period, from October to 15th January, during which period it is patrolled in all weather. The line was constructed in 1874-75 and experience has shown that patrolling was not necessary at other times. In fact so free has this section been from flooding or breaches that the District Engineer

recommended in 1937 that patrolling might be reduced during the north-east monsoon. The Chief Engineer, however, did not agree to their reduction. I have therefore no hesitation in absolving the Administration of any blame in not having a permanent system of patrols.

29. In estimating the amount of waterway to be provided for each stream and for local drainage, Constructing Engineers are guided chiefly by local conditions and previous records of floods, rainfall, run off, etc. The Engineers should be liberal in assuming the magnitude of the discharge to be provided for, but to provide an extravagant opening to cater for phenomenal flood which may occur once or twice in a century would be unwarranted in many instances and would be bad engineering practice (*vide* Waddell's Bridge Engineering, Vol. II, page 1110 Seq.). Damage which might result from such an extreme flood would be faced if and when it occurred. It would be a grave misfortune if such damage should involve loss of life.

In determining waterways for small streams the engineers of the South Indian Railway and of the Madras Public Works Department generally use Ryves formula for maximum discharge and modify it to suit local conditions. Bridge openings proposed by railway engineers are submitted for approval to the Public Works Department:—

Ryves formula is $D = C^3/\overline{M^2}$.

where D = maximum flood discharge in cusecs.

M = square miles of drainage area.

C = 450 within 15 miles of the sea.

= 562·5 between 15 and 100 miles.

= 675 for limited areas near hills.

In 1873 when bridge No. 1278 was designed the rainfall statistics and other reliable data regarding the incidence of floods, etc., which could form a reliable basis for estimating the waterway were probably scanty. About 1879 the Government Tank Restoration Scheme Memoirs for the Dindigul minor basin in which this stream lies, show that the value adopted for C in the Government scheme was 350—500. The catchment area of the stream passing through bridge No. 1278 is a small one, the whole of which might be included in a local cloud-burst and it lies among hills. The higher limit for C would therefore be a reasonable one to adopt. The catchment area is 2·18 sq. miles.

So by Ryves formula—

$D = 1{\cdot}68\ C.$

or $D = 840$ cusecs with $C = 500$.

and $D = 1134$ cusecs with $C = 675$.

A discharge of 1134 cusecs from this area is equivalent to a run off of 7/8 inches per sq. mile per hour and might result from $3\frac{1}{2}$ inches of rain in one hour while 840 cusecs might result from 2·2/3 inches per hour.

30. For estimating the mean velocity of the stream and the safe velocity through the bridge there are various formulæ based on slope of flood line, cross section of stream and nature of bed. The bed width of the stream is about 22 ft. and depth 3 ft. and fall 1 in 230; with this depth of water the velocity would be about $4\frac{1}{2}$ ft. per second. The soil is mostly hard clay or clayey moorum and experience has shown that scour commences in this soil at a velocity of about 7 to 8 ft. per second, *vide* handbook dated 1937 issued by the Madras Engineering Association Public Works Department, Madras. As the depth of the flood in the stream was about 7 ft. the velocity would be roughly in proportion to square root of depths, viz. $\sqrt{7} \div \sqrt{3} \times 4{\cdot}5$ or about $6\frac{1}{2}$ feet per second. The velocity through the bridge would be increased by the afflux and for the floored bridge could safely be 10 feet per second. Assuming that in designing the waterway of the bridge the engineers took maximum discharge at 840 cusecs and critical velocity at 7 ft. per second, the required waterway would be 120 sq. ft. The construction engineers may therefore

be considered to have provided a reasonable waterway 20 ft. wide and a reasonable height of bank with a freeboard of about two feet. This waterway appears to have coped successfully with a greater flood prior to 1906 than that which occurred on August 20th. Had conditions remained unaltered no damage would have resulted from the latter flood. No blame can therefore be attached to the construction engineers.

31. The engineers who permitted the bridge to be floored subsequent to 1905 cannot however be absolved from blame. By raising the floor level they reduced the margin of safety provided by the construction engineers in determining the height of the bank by nearly 2 ft. and eliminated a further factor of safety by preventing scour. The foundations of the bridge are six feet below the original floor so that scour could have occurred with safety to assist in passing an exceptional flood. If when the flooring was raised the engineers were aware that a flood of 7 ft. depth had previously passed through this bridge they incurred a grave responsibility in laying the new floor on top of the original floor thus raising the river bed level by nearly two feet. The responsibility for the damage to the bank on August 20th must also be shared by the District Board engineers, who in 1930 raised the level of the road and provided a bridge with 90 sq. ft of waterway, thus preventing a free escape of flood water through the railway bridge. The survey plan showing the high flood levels above and below the railway bridges on August 20th shows that the flood water was impounded between the road and railway embankments to a depth which submerged the road bridge openings by 1·7 feet. It is highly probable that had the old Irish bridge been in existence the flood of August 20th would not have risen to a height which would have endangered the railway embankment.

32. Finally there is the question as to whether prompt and efficient action was taken after the accident occurred.

I shall deal first with the train crew. The driver and second fireman were not in a state to take any part in the proceedings. The driver states that he reminded the guard to protect the train from the Vadamadura direction. The guard, an Anglo-Indian, timed the accident at 0-11 hours. He was uninjured, though shaken. He made a tour of the wrecked train, assisted some passengers to escape, sent a verbal message to Ayyalur by the travelling ticket examiner, and shortly afterwards, when he had been round the wreckage, he despatched his accident memo. by the under-guard. This message was delivered at Ayyalur at 1-10 hours, a distance of two miles on a dark night. Thus prompt and efficient action was taken by the guard whose behaviour throughout appears to have been excellent. He protected his train from the rear at once and, after a short delay, from the front also. He then opened his first aid box and rendered aid to the passengers in which he was trained.

The behaviour of the postal sorters is praiseworthy as after their miraculous escape they appear to have salvaged much of the mail.

33. The non-arrival of No. 11 at Vadamadura had been discussed between the two Station masters even before she was due, as her head light was not sighted. Control was informed who instructed each station to send out pointsmen in the direction of the train.

On receipt of the accident memo. the assistant station master at Ayyalur acted with promptitude and intelligence. District and Central Controls were at once advised and medical and police assistance was asked for through station master, Vadamadura. Unfortunately the doctor could not be found.

The station master, Ayyalur, and permanent way sub-inspector were called by the assistant station master and proceeded to the accident with lamps, gangmen and coolies accompanied by the underguard and ticket examiner and all appear to have rendered valuable assistance. The permanent way sub-inspector was trained in first aid.

34. No. 12 Passenger was at Dindigul at 1-5 hours and the District Train Controller from Madura was on board. Hearing of the accident

soon after arrival he organised the first relief train with the engine of No. 12 and a spare rake at Dindigul. A doctor on No. 12 volunteered his services. The train left at 2-18 hours with a large relief party with medical stores, stretchers and lights. It reached the accident at 2-52 hours and the Controller at once connected up a portable telephone.

A secnod relief train was rapidly organized at Madura composed mostly of officers, coaches. It left at 3-0 hours accompanied by the District Officers and party. It arrived at the accident at 5-55 hours after crossing the returning first relief train.

Trichinopoly had also been busy. The hospital special left with the Chief Transportation Superintendent and party at 3-52 hours reaching the accident at 5-20 hours.

35. 76 passengers including the majority of the more seriously injured were cleared by the first relief train accompanied by two doctors at 5-10 hours.

Less serious cases and uninjured were cleared about the same time in two buses to Dindigul.

The balance of the injured and uninjured were cleared by the officers' special at 7-5 hours

The medical assistance was meagre but allowance must be made for the time and place of the accident. Unfortunately there appears to have been no one of sufficient character to organise the work until the arrival of the first relief train at 2-42 hours. This train brought a doctor and a District Train Collector. There was a doctor in the wrecked train who was uninjured but appears not to have come to notice. He wrote to me that he had attended to a few people. The doctor at Vadamadura could not be found. The first active doctor arrived at 2-42 hours followed by the Government doctor at Dindigul who was called at 2-19 hours and arrived soon after 4-00 hours by bus. He was followed by the Principal Medical Officer of the Railway who arrived by car from Trichinopoly with an assistant at 4-40 hours. No other medical help appears to have been forthcoming before the arrival of the hospital special at 5-20.

This resulted in a few serious cases being unattended to until after 5-00. The few doctors available could not handle the large number of injured effectively.

Other doctors met the relief trains at Dindigul and Madura.

The Guard and Permanent Way Sub-Inspector rendered first aid assisted by a compounder who was on the wrecked train.

The medical equipment at the accident was more than sufficient but extra stretchers had to be improvised.

36. The Police arrangements appear to have been good. There is no evidence of looting. The unidentified dead bodies were photographed before burial.

The Police constables on the wrecked train were among the injured. The Head Constable at Vadamadura appears to have walked to the accident with a few men. Railway Police arrived with the first Relief train at 2-42 hours. More police arrived from Dindigul by a bus which took back some injured. The District Magistrate, Madura, and the District Superintendent of Police, Madura North, who were camping at Dindigul hastened to the spot with a large party of police.

37. Breakdown trains were organised at Madura and Trichinopoly. That from Madura left at 4-30 hours and was available as soon as the officers' relief train left the site. The breakdown train from Trichinopoly left at 6-15 hours, being delayed by a variety of circumstances. Its late arrival, however, caused no delay as it could not have commenced work earlier than it did. The causes of the delay to the Trichinopoly breakdown train are being investigated by the Railway Administration.

38. The injured in the hospitals were frequently visited by the Railway medical staff and by the Agent and General Manager who offered to defray

the expenses of the destitute injured passengers from his private purse. I visited some injured at Dindigul.

39. At a meeting between the Engineers, Transportation and breakdown staff at the accident on the 21st morning, the alternatives of clearing the wreckage and restoring the original alignment or of making a diversion round the wreckage were discussed. It was decided to adopt the former alternative as the diversion would prove more laborious and lengthy. I agree with this decision.

40. The salvage work was carried out under difficulties. Evidence shows that care was taken by the breakdown gang, the Engineers and the Police to ensure that no dead bodies remained in the ground or debris during the work of restoring the bank. The wreckage was cleared from the alignment by the evening of the 24th and the Engineers completed the track by 10-15 hours on the 25th when through communication was restored. The majority of the mail bags, if not all, were salvaged.

41. To summarise, my conclusions are :—

(i) That the accident was caused by the breaching of the embankment at mile 255/15-16 as a result of phenomenal rainfall in the catchment area of the small stream at mile 255/10.

(ii) That all reasonable care had been taken by the Railway Administration and in the absence of warning, the accident could not have been avoided by any member of the railway staff, with the possible exception of the Permanent Way Sub-Inspector, Ayyalur, who, as events show, committed an error of judgment in not having the section patrolled, but it is easy to be wise after the event.

(iii) That the bank, as constructed, provided a reasonable margin of safety, taking into consideration the data which was available to the Construction engineers. This margin of safety was endangered by the provision of a pucca flooring 2 ft. above the original floor level of the railway bridge at some time subsequent to 1906 and by the construction of the road embankment in 1930, which restricted the free run off of flood water through the railway bridge. I consider that the bank would not have breached on August 20th if the original floor level of the bridge had been maintained, nor in all probability, even with the present floor level of the bridge if the District Board authorities had not converted the road causeway into an embankment with a slab culvert opening 3′ × 6′ × 5′ down stream of the railway bridge. Both the railway and the District Board engineers incurred grave risks by these alterations.

(iv) That the villagers who appear to have been aware of the breach, perhaps two hours before the accident occurred, were lacking in all sense of public duty in not reporting their knowledge to some railway servant.

(v) That the action subsequent to the accident was prompt and effective.

42. **Remarks and Recommendations.**—The apparent apathy of the uninjured passengers calls for remark. With a very few exceptions they did nothing to help. After satisfying themselves as to the fate of their own relatives or friends, they got into the undamaged lighted vehicles and sat there till daylight.

The villagers, who collected soon after the accident, are said to have refused assistance, being afraid to approach the wreck, possibly for fear of being accused of looting.

43. I beg to offer the following recommendations :—

(1) The railway embankment on the level portion where the accident occurred be raised by about 2 feet.

(2) The flooring under bridge No. 1278 should be removed. If considered necessary a stone floor may be provided below the original bed level. A 10 feet bridge with pitched approaches should be provided in the level portion of the embankment or alternatively a bund should be provided to prevent riverflood water from heading up behind the low portion of the bank.

(3) As this disastrous accident occurred owing to the bridge not being sited at the lowest point of the embankment or alternatively to the bank being too low resulting in the bank being topped while the water level was still 6′-3″ below rail level at the bridge I recommend that all District Engineers be instructed to bear this in mind at their next annual inspections and to examined all bridges situated on a grade with a pocket of low ground above the bank down grade from the bridge. Where such a situation is found they should recalculate the waterway of the bridge limiting the depth above floor level available for passing the maximum discharge to the level of the lowest portion of the bank forming the pocket. When necessary, remedial action should be taken by raising the bank to a safe height.

(4) More definite orders regarding patrolling during and after heavy rains should be circulated to the engineering staff. This staff should also be instructed to caution drivers when heavy rain has occurred. Drivers should be instructed to be on the alert and cautious when approaching bridges and banks after very heavy rain in hilly country.

(5) Mates, gangmen and others should carry out some propaganda in villages, near the railway line, explaining the necessity of immediately reporting to them any damage or obstruction to the track which they may discover.

(6) Station masters should maintain a record of the addresses of doctors living near their stations. When medical assistance is required station masters in the area should be broadcast and told to advise these doctors.

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4. GREAT INDIAN PENINSULA RAILWAY.

Derailment of No. 423 Down mixed train between Warora and Majri (Wardha-Balharshah Section) on the 11th September 1938.

FROM THE HON'BLE H. T. DE B BINGHAM, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, LETTER No. 1408, DATED THE 24TH SEPTEMBER 1938. (7424-T.).

1. **Description of the Accident.**—Between 24 hours on September 10, 1938, and 1 hour on September 11th, 1938, while No. 423 Down Mixed Passenger train was travelling between Warora and Majri,* a pair of wheels of one of the wagons apparently derailed at mile 521/3, and was dragged along the ballast bending tie bars and breaking the pot sleepers. Just after, and at some point between mile 521/3 and 521/4, another pair of wheels belonging to the same vehicle was derailed, and the vehicle was dragged completely derailed across a $2 \times 10'$ open girder bridge at mile 521/4, breaking the ends off the bridge timbers and damaging the masonry of the bridge.† There were clear marks of the two pairs of derailed wheels on the timbers of this bridge. Between mile 521/4 and mile 521/6 other wagons were derailed possibly due to cross strain or to having been fouled by the derailed wheels of the first wagon which might have been swept off as that wagon crossed the bridge. The draw bar hook of the sixth wagon from the engine then broke leaving the derailed and piled up vehicles stationary while the engine and 5 leading wagons shot ahead on the rails for about 200 feet. In all six goods wagons and two South Indian Railway Parcel vans were derailed and capsized and two third class bogies derailed. The two rear most bogies as well as the engine and five leading wagons remained on the rails.

2. The composition of the train was as follows :—

Engine No. 1509 D/5 (not derailed) followed by 5 wagons of which 4 were loaded and one in the middle empty. These five were not derailed. Then came 6 loaded wagons all derailed and capsized. Then 2 South Indian Railway Parcel Vans both empty and derailed and capsized. Then 2 Third Class Bogies derailed, and finally 2 Third Class Bogies not derailed. This mades 17 vehicles in all.†

The distance from the point of first wagon derailment at mile 521/3 to the resting place of the sixth wagon from the engine was approximately 939 feet and the engine and 5 leading vehicles after breaking away travelled, with vacuum destroyed, another 200 feet but remained on the track. Assuming that the first derailment occurred to some wagon or wagons situated about half way along the train it is estimated that the engine dragged roughly $700' + 200' = 900'$.

The track between mile 521/3 and 521/5 was fairly badly damaged and between mile 521/5 and 521/6 was completely uprooted. Serious damage was done to rolling stock. The total damage caused by the accident is Rs. 21.849.

3. Break Down Trains from Wardha and Ajni arrived at Warora at 4-40 hours and 9-12 hours respectively on the 11th September 1938 and proceeded to the scene of the accident. The two third class bogies were re-railed at 5 hours and 18 hours respectively on the 12th instant and brought back to warora; the remaining vehicles were moved clear of the track and left at the site of the accident. The last vehicle was removed from the track at 2/10 hours on the 13th instant and the track restored at 3 hours. The first train to pass over was No. 49 Down which had suffered a detention of about 10 hours at Warora.

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* Ry. Bd. D. B. No. Misc/K. 7(2).

† Ry. Bd. D. B. No. Misc/K. 7(1).

4. Transhipment of passengers and goods was necessary on the 11th and 12th instant and was carried out in a satisfactory manner.

The Sub-Assistant Surgeon, Wardha, reported that one passenger and the guard of No. 423 Down were slightly injured and that medical aid was rendered.

5. **Description of the site of the Accident.**—The line between Warora and the scene of accident lies mainly on a low bank on a falling gradient of 1 in 200 alternating with short level stretches as far as mile 521, after which it rises at a gradient of 1 in 200 with short level portions almost to mile 522. The site of accident (mile 521/3 to mile 521/7) is on the straight.*

The track consists of old 82 lbs. B. H. 36 foot rails on N + 3 pot sleepers.

The formation in this locality is black cotton soil which was soft at the time of the accident owing to almost continuous rain since the commencement of the monsoon. The rainfall up to the end of August 1938 has been registered at 40½ inches, while for the same period last year only 22½ inches is recorded.

6. This accident bears a remarkable resemblance to a derailment to Mixed Passenger Train No. 411 Down which occurred at a place a few telegraph poles further on, *i.e.*, mile 521/11 to mile 521/15, on the 17th September 1937.†

The exact cause of last year's accident could not be ascertained but the probable cause was assigned to some defect in one of the wagons which caused it to derail and drag other wagons off. Excessive speed was also mentioned as a contributory cause.

7. **Conclusions.**—The possible causes of the present derailment may be stated as follows :—

(a) Some obstacle on the track.
(b) Malicious tampering.
(c) Track defect; such as a severe kink, sudden depression or a fractured rail.
(d) Excessive speed.
(e) A mechanical defect in one or more vehicles.

8. As regards (a) there is conclusive evidence to show that a thorough search was made for any possible obstacle that might have caused a derailment but none could be found. Not only was the track searched right back to Warora for any vehicle fittings which might have fallen off but the vehicles themselves were checked up and all fittings which might possibly have dropped on the line and caused a derailment were accounted for. I therefore rule out (a).

9. As regards (b) there is no evidence to show that any malicious tampering with the track took place neither is there any reason to suspect this. I therefore rule out (b).

10. As regards (c) on the 14th September I made a very careful inspection of the track in the vicinity of the accident and also between Warora and Majri. I found the general condition of the track on this section somewhat below the average for a track carrying comparatively fast passenger trains. The track consists of old 82 lbs. rails on pot sleepers and although the ballast supply is liberal the fact of it being located through particularly bad black cotton soil country renders the track to some extent unstable and the maintenance difficult. During my inspection of it from Warora, it was observed that the gauge would vary in a short distance from 1/4″ tight to a 1/8″ slack and that the cross levels varied in places up to 3/4″, the alignment too was inclined to be wavy and the joints low. It is questionable whether a pot sleeper road is particularly suitable for this bad black cotton soil section which I understand extends from Warora

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* Ry. Bd. D. B. No. Misc/K. 7(3).

† S. N. 5 in pros. Apl. '38, 7127-T/1-8, B.

to Tadali. I did not consider the general condition of the track between Warora and Majri as unsafe but I do consider it a difficult one to maintain in proper order during the rainy season and therefore liable to fall below the "fair" line. As regards the condition of the track in the immediate vicinity of the accident I could find no undue conditions, in fact the general condition for about 1/4 mile before the site of the accident is somewhat better than further back towards Warora. I would classify the general condition of the track between Warora and Majri as safe, provided the speeds in force are adhered to, but "rough" and "uncomfortable" due to minor irregularities in all planes of alignment and gauge from the unequal settling of individual pots.

11. The evidence concerning the general condition of track and at the site of the accident is not conflicting and corroborates my views. The permanent Way Inspector Chanda trollied over the section on the 8th September and found the track had various slight depresssions in it due to heavy rain and black cotton soil. He checked the track at point of derailment and in the vicinity soon after the accident but found nothing unusual, gauge 1/16″ tight, cross levels and joints varying up to 3/8″. His maintenance gangs are 4 men per mile during monsoon conditions *plus* a flying squad of 1 mate and 14 men for general use. He has never been refused labour. I consider this allowance of labour generous and sufficient. His opinion is that the running of fast trains on this section is "not so good" and wisely recommended a speed reduction from 60 miles per hour to 50 miles per hour at the beginning of the monsoon. This was conceded. The maximum speed of Mixed Trains is 35 miles per hour. While riding on fast passenger engines he has never noticed any particularly bad places, but running is uniformly "not so good".

12. The Sub-Permanent Way Inspector, Warora, states that he finds the track worse between Warora and Tadali than on other parts but has had no particular trouble at the actual site of accident but there are some other "troublesome places".

The Mate of the gang, in charge of the length, states that he was packing up the track close by. He has not noticed particularly bad places.

The Driver states that his engine ran steadily and that he did not experience any undue oscillation between Warora and mile 521/3 nor did he feel any bump or jar just before his train stopped.

The Loco. Inspector was on the train at the time of the derailment and checked up the gauge with Permanent Way Inspector, Chanda, and others and found differences in level at the joints and at the centre of rails up to 7/16″ (Hogging).

The Guard, who has been up and down this section continuously for 5 years, states that the track is "not good" between Warora and Tadali and classifies it as "poorish".

The Occupation Passenger Driver being rather important, as he is a driver who took a light engine over the site of accident only 2 hours before the occurrence, states he felt nothing out of the ordinary.

The Divisional Engineer, Nagpur, checked up the track soon after the accident and found nothing out of the ordinary.

13. Besides the above there is a statement by the Divisional Transportation Superintendent, Bhusawal, saying that he has received frequent complaints from the Divisional Engineer and Resident Engineer that the track is getting knocked about by excessive speed of express trains.

There is also a statement concerning the track in the vicinity of the accident by the Chief Engineer who happened to be near at hand on the morning of the accident and inspected the site soon after the occurrence. He states that the Resident Engineer checked up the track and certified it as good and that it appeared to him to be in good condition but at the time he was there the relief train was standing on the approach and so he could not check it himself.

14. I have gone into the matter of the condition of track in detail and with care because the fact that there was a similar derailment last year, only a few telegraph poles further on, would tend to bring the track at this vicinity under suspicion. There is no doubt that the general condition of the track in these parts during the monsoon has been causing some anxiety to the Engineers concerned, and I note the wise precaution of supplying extra gangs, the reduction of speed from 60 miles per hour to 50 miles per hour and the complaints made to the Divisional Transportation Superintendent concerning the excessive speed of trains. The fact that neither the engine and first 5 vehicles nor the last 2 vehicles of the train were derailed also leads me to suppose that there could not have been anything radically wrong with the permanent way.

From my own personal inspection and testing of the track in the vicinity and after consideration of all the evidence I find that the condition of the track was not in itself a sufficient cause for derailment.

15. As regards (d) (excessive speed) the speed of all mixed trains is limited to 35 miles per hour. The very nature of the gradient on the run between Warora and mile 521/3, the site of derailment, is tempting and encouraging to drivers to let their engines race*. Down gradients of 1 in 200 followed by short level stretches and finally a 1 in 200 up gradient commence just before the site of derailment. It is possible to visualize a driver coasting down the 1 in 200 gradient at speed and then opening up near the bottom of the last one in order to sail up over the 1 in 200 up gradient in front of him. The driver in this accident admits that he felt nothing out of the ordinary until the last moment and so he would have had his regulator open until the train came to a halt of its own accord. In doing so he dragged vehicles a total distance of some 700 or 800 feet and even after parting he shot on another 200 feet with 5 vehicles. He states that his speed was about 25 miles per hour just before he took the rise of 1 in 200. It appears from the marks on the rails that only one wagon was derailed at first and was dragged about 650 feet and it is admitted that a driver might not be aware of one derailed wagon for some considerable time. But even taking this into considration it seems difficult to account for a driver continuing his course unaware of anything out of the ordinary having happened even when a number of vehicles have become derailed and the vacuum pipe severed.

I consider therefore that he must have been going considerably faster in order to have dragged and piled up vehicles as he did.

We have the evidence of the Loco. Inspector, who happened to be travelling on the train, who states that he looked at his watch immediately after the accident and found the time 0·37. Having left Warora at 0·23 the average speed over the distance of $5\frac{1}{4}$ miles was $22\frac{1}{2}$ miles per hour. Concerning the doubtful utility of averages in the determination of maximum speeds I have taken extracts from the Train Register at Warora of the 4 daily Mixed Passenger Trains for the week previous to the accident but in no case does the average speed taken come to more than 35 miles per hour but several are round the 30 miles per hour mark. This is no indication of any speed at any point on the section and therefore timings between stations are not of very much use except as a pointer. In only one instance, between Hinganghat and Nagri. is the time less than what is allowed (17 minutes as against 24 minutes, distance 10 miles, average speed 35·3 miles per hour) and in this case we see that the driver of that train, allowing for starting and stopping, must have exceeded for some distance the maximum speed of 35 miles per hour permissible.

16. The Driver, Jotiprasad Kunjabehari, states that on 10th September 1938, the day previous to the accident, he worked a train from 7-30 hours to 18-00 hours when he arrived at Warora. He then went for his rest and in the middle of it received a Call Book to take No. 423 Down leaving Wardha at 22 hours same day. He states he "volunteered" to take the train and told the Engine Turner at the Loco. Shed that he would "like to take his turn". We see therefore that this driver had

* Ry. Bd. D. B. No. Misc/K. 7(3).

only 4 hours between trains to take his rest which probably means he did not get more than 2 hours unbroken sleep after being on duty for 10½ hours, which appears to be insufficient for a man about to take another train.

After careful consideration concerning the speed at which the driver of No. 423 Down Mixed was going at the time of accident I come to the conclusion that he was probably travelling at a speed somewhat over 35 miles per hour but as far as general observation and evidence goes not at an excessive speed, possibly about 40 miles per hour. I am of the opinion that perhaps due to insufficient rest, he was not fully on the alert at the time of the accident and that he might have stopped his train earlier and saved the excessive damage done to it.

17. We now come to (e), and the possibilities of some mechanical defect in one or more of the vehicles. It is clear that one wagon came off first and was dragged about 650 feet before any other wagon became derailed. It is very probable that both pairs of wheels of this wagon came adrift after violent contact with the edge of a low parapet wing wall or pilaster of the $2 \times 10'$ span girder bridge.

It was a merciful thing that the couplings on either side of this wagon held, otherwise it would have plunged into the nullah below dragging other wagons with it. After this there was a general derailment and capsizing until the train came to a halt. The question is which wagon came off first? The only wagon that had both pairs of wheels completely off was wagon E. I. No. 42258 loaded with coal (Tare 9 tons, contents 18 tons, total 27 tons). But this wagon was placed 9th from the engine and there were 3 wagons derailed in front of it, so possibly any of these might have been the guilty one and we cannot rule out altogether wagons that came behind E. I. Railway No. 42258. All these 6 wagons were so badly damaged and bent that it has been impossible for anyone to locate any previous fault or defect in any wagon. I can therefore only suspect wagon E. I. No. 42258 as being the first to derail on account of its being the only wagon with wheels swept off by some obstruction, possibly while dragging over the two 10′ span open girder bridge.

18. I find therefore that the accident was occasioned by the derailment of some wagon unknown and that its derailment was caused by some defect in it which cannot be ascertained. The general condition of the track together with some sudden acceleration of speed causing a jerk might have been a contributory cause of the derailment.

19. **Summary of Conclusions.**—(a) There was no obstacle either fallen or placed on the line.

(b) There was no malicious tampering with the permanent way.

(c) The general condition of the track between Warora and Majri was mediocre and "rough" due to black cotton soil and monsoon conditions but this state was not in itself sufficient to cause derailment. I could find nothing radically wrong with the track in the immediate vicinity of the accident, its condition here was much the same as elsewhere.

(d) I conclude that the driver of the train must have been exceeding the speed limit of 35 miles per hour, but not to any appreciable extent. This speed should not in itself have caused a derailment but, if coupled with a sudden jerky acceleration on a somewhat mediocre track, might have been a contributory cause.

(e) I find the accident was caused by the derailment of some wagon which cannot definitely be determined, possibly E. I. R. No. 42258 and that the general condition of the track coupled with a suddent jerky acceleration might have been a contributory cause.

20. **Recommendations.**—(a) A strict examination of wagons for defects and overloading over the section Wardha to Balarshah.

(b) That the track between Warora and Tadali be improved as regards general stability by a further liberal supply of ballast.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 31st March 1939

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Note.—Mr. H. A. Joscelyne's report of an enquiry held to investigate the circumstances attending the **derailment of No. 9 Up Dehra Dun Express between Chichaki and Hazaribagh Road (E. I. Ry.) on the 12th January 1939** has not been included in this collection, as it was printed and published separately. (Price of the publication—Annas 4.)

1. EASTERN BENGAL RAILWAY.

No. LK-96 Down Passenger train running into a bullock cart at level crossing No. E.-3, mile 23|2, near Gocharan Station (Lakshmikantapur-Baruipur Section) on the 24th September 1938.

FROM MR. K. B. LAL, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, LETTER NO. 1798, DATED THE 19TH NOVEMBER 1938. (7429-T.)

Description.

At about 22-55 hours on the 24th September, 1938, L.K.-96 Down passenger train ran into a bullock cart occupied by the cartman and a boy at Level Crossing No. L3|E, mile 23|2, on the Lakshmikantapur-Baruipur Section of the E. B. Railway. The bullock cart was completely broken in pieces. The cartman died while being taken to Calcutta for treatment but the boy survived after treatment in hospital.

The train consisted of 4 Bogie coaches and 3 four-wheelers, drawn by Tank Engine No. 627 B. T. C. 2-6-4. The weight of the entire train was 258.4 tons and the overall length 350 ft. including engine. The engine was fitted with head lights which were on, at the time of the accident, and vacuum brake was in operation on all the wheels of the coaches, and on all the coupled wheels of the engine.

2. The engine of No. 96 Down struck the cart in the middle breaking it to pieces, carrying it forward 32 ft. and throwing it off 13 ft. to the right. The two bullocks were carried forward 64 ft. and 81 ft., respectively and killed straightaway. The boy was found 35 ft. ahead of the crossing, 13 ft. off the line to the right, being seriously injured. The man was carried 246 ft. forward and found seriously injured under the second bogie from the engine.

The speed of the train was about 30 m.p.h. and it proceeded for about 300 ft. beyond the point of accident before coming to a stop.

There was no damage to the rolling stock nor to the permanent way.

Description of the locality of accident.

3. The level crossing is 1,218 ft. from the up outer signal at Gocharan station, the whole of this length of track being on the straight and level. Every down train leaving Gocharan runs over a curve of 2 degrees before running past the up outer signal. The level crossing is visible to a down train from a distance of 1,232 ft. Anybody at the level crossing itself will be aware of the approaching train because of the head lights, while the train was still 1,232 ft. away from the same. In the other direction, i.e., the south, the track is straight for several miles.

4. The level crossing in question is for a metalled road taking off from the main road running from Calcutta to Kulpi and leads to Khagurdah. The road on the east side is straight, but that on the west is straight for about a distance of 60 ft. from the gates, then curves slightly to the south. The crossing itself is at an angle of 60°. Two single leaf wooden gates are provided at the crossing without any latches. Lamps have been provided with red and white lights which being square to the gates, and the gates being at an angle of 60° to the road, are of no benefit as a warning sign to road users. The view of trains approaching the level crossing is obscured by small jungle some of which bore marks of having been cut recently.

The train was travelling from North to South and the bullock cart from West to East.

The train service on this Branch consists of 9 trains each way.

5. A census of road traffic at the level crossing was taken for a week, and details are attached as Appendix* A. The gate lodge provides accommodation for two men, but the second man was reduced in 1933 with the approval of the Civil Authorities. The crossing, however, continued to be classed as ' B ' class.

There are no wicket gates provided at the level crossing and unless the gates are opened for each pedestrian, he has to go round the fencing over low ground. A sketch of the Level Crossing is attached as Appendix* B.

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*Not printed.

Report and Evidence.

6. The evidence about the position of gates at the time of the accident is conflicting. I have, however, no doubt that the gate on the west side through which the cart entered on to the level crossing must have been open for the cart to get in. The lamps at the gate were not lit, although it would have made no difference to the accident occurring.

The driver stated that he saw the cart when 5 feet away from it. I think he misjudged this distance, but all the same there is no reason for his not having seen the cart from a very much longer distance if he had been vigilant. The cart is slow-moving vehicle and it could not suddenly shoot out to the middle of the track.

The boy who was on the cart could not be produced at the time I held the inquiry but he was examined subsequently by the Inspector of Police. He could not say how the accident occurred, but admitted being asleep on the cart before the accident.

7. There is no evidence about the driver having sounded the whistle while approaching the level crossing, except his own statement, and that too seemed to be an afterthought. I am convinced the driver did not whistle.

Copy of evidence recorded is enclosed as Appendix* C.

Conclusion.

8. The failure of the two men on the cart to see the engine headlight from a distance of 1,232 feet, when the cart must have been at least 60 feet away from the level crossing can be explained, only on the assumption that they were both asleep as is so often the case with cartmen covering long distances at night. If the gate on the west through which the cart first entered the level crossing had been closed, though not locked (as stated by the gateman), it would have been necessary for the cartman to get down from the cart and open the same. Under these circumstances it is impossible to imagine that he would have failed to see the headlight of the train approaching and would not have saved himself from death.

9. The census of road traffic taken at the level crossing coupled with the fact that no wicket gates are provided would seem to justify the restoration of the second gateman at this level crossing. If a second man is not permanently posted at the level crossing, he should be there at least on *Hat* days when the traffic is particularly heavy.

10. There is no doubt that the gateman neglected his duty in leaving the gate open. At the same time it is doubtful if he could carry on single handed the strenuous work, necessary to pass all traffic in safety.

Recommendations.

11. (*a*) Wicket gates should be provided at this and other similar level crossings.

(*b*) The gates should be fitted with proper latches.

(*c*) The approaches to the level crossing should be kept clear of all jungle.

(*d*) The lights fitted to the gates should be properly adjusted so that they can be clearly seen by road users.

According to item 6 of the Railway Board's classification of and specification for level crossing corrected up to October 1936 no light should be visible to the driver of the train.

(*e*) Drivers when approaching level crossings should whistle and be on the alert.

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*Not printed.

2. EAST INDIAN RAILWAY.

Derailment of No. 18 Down Express at Bhadaura on the 16th October 1938.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 1944|XIII|38, DATED THE 16TH NOVEMBER 1938. (7441-T.)

In accordance with rule 8 of Railway Department Notification No. 1926-T., dated 19th March 1930, and with reference to my preliminary report *No. 1778|XIII|38, dated 21st October 1938, I submit herewith the full details of an enquiry held by me into the circumstances attending the above accident which occurred at Bhadaura on the East Indian Railway on 16th October last.

I first received intimation of the accident at about 7 A.M. of 16th October and proceeded to the site the same day arriving early morning of the 17th.

I held the enquiry the same morning after having studied the scene and all the features concerning the accident.

The following officers were present :—

Mr. W. H. H. Young, Chief Operating Superintendent, E. I. Railway.

Mr. A. O. Evans, Divisional Superintendent, Dinapore.

Mr. H. V. M. Stewart, Superintendent, Power, Dinapore.

Mr. S. Tandon, District Magistrate, Ghazipur.

Mr. Kharag Singh, Superintendent, Police, Ghazipur.

Mr. S. Hussain, Section Officer, Allahabad.

Description of Accident.

On the 16th October 1938 Train No. 18 Down known as the Down Punjab Express was composed of the following :—

Engine	..	No. 1062 PC1.
First Class	..	No. 2544.
Third	..	No. 3710.
III, I, Luggage and Brake	..	No. 3535.
Third	..	No. 3100.
Inter, First, Third	..	No. 3574.
First and Second	..	No. 3864.
Third	..	No. 2952.
III, I, Luggage and Brake	..	No. 5102.
Inter and Third	..	No. 2537.

The last coach had been attached at Moradabad, the rear brake van in which the guard was travelling was therefore the eighth coach. The train was running 6 minutes late having left Dildarnagar at 3-50 hours. After travelling about 4½ miles and when approaching Bhadaura flag station at approximately 3.58 hours the driver of the train experienced a very severe lurch accompanied by a loud report. He applied his brakes immediately and brought the train rapidly but steadily to a standstill. The engine came to a stand almost at the centre of Bhadaura platform. The train is not booked to stop at this small station. Being so early in the morning, day had not broken and it was still dark. There was no moon.

2. An examination of the situation by the train staff revealed the following. The engine was derailed of its trailing bogie wheels and leading tender wheels, all to the right hand side. The seven coaches following were standing correctly on the rails. The eighth coach, the composite brake van was completely derailed of all wheels, was slightly askew to the track and canted over to the left side, whereas the last coach, the ninth, a composite Inter and Third, was totally wrecked. This coach had been apparently derailed for some distance and had been dragged along on its side. The body work had become stripped clear of the underframe which had then turned completely over and was lying upside

down. All the couplings remained intact. This fact of the body becoming separated from the underframe was probably a fortunate occurrence as it caused the passengers to be thrown out instead of remaining in the coach where certainly many of them would have been crushed. As the body separated it became completely disintegrated, the roof alone remaining in one piece.

In capsizing both bogies of the last coach fell clear from the frame and the trailing bogie truck travelled to the right fouling the Up line.

3. Without any delay the train staff set about protecting the train in the rear and also the Up line with fog signals and red lights. The station staff at Bhadaura were aroused and advice of the accident was despatched to ' Control '.

No time was lost in rendering assistance to the passengers in the train. There were no casualties in the underailed coaches nor in the derailed brake van. In the wrecked trailing coach there were, so far as can be ascertained, about 60 passengers including a Mohammedan marriage party from Lucknow. One passenger was found killed and 40 were injured, several seriously. Of these four subsequently died in hospital. Considering the manner in which the coach was smashed it is surprising that there were not more outright fatalities.

There were travelling on the train a crew of ticket checkers consisting of eight men, also a hospital compounder. These men with the train crew did excellent work in attending to the casualties.

An Up empty coaching mela special was at Buxar and this was sent as the first relief to the site of the accident with the Sub-Assistant Surgeon, Buxar, Transportation Inspector, Permanent Way staff, Watch and Ward coolies with stretchers and other appliances. This relief arrived on the scene shortly after 6-30 hours.

All the injured were taken to Buxar and received further treatment by shortly after 9 hours. Before midday they left for Arrah where they were admitted to the Civil Hospital.

Immediate guard was placed over the track and wreckage until I arrived on the scene next day. Nothing was moved except the bogie truck fouling the Up line, so as to restore through running, and such of the wreckage as was necessary to rescue passengers.

A rumour was for a short time afloat that two lady passengers were missing. This was dealt with by the civil authorities who satisfied themselves that the rumour was unfounded. I agree with them.

The Moghalserai relief train arrived on the scene with further medical relief at 7-52 hours and single line working was introduced at 9 hours.

On completion of the enquiry the wreckage was removed and double line working resumed at 22-12 hours on 17th October.

Cost of damage to Permanent Way amounts to about Rs. 1,718 and to Rolling Stock Rs. 4,743.

Description of site of Accident.

4. The scene of the accident is in open flat country within half a mile west of Bhadaura, a small flag station on the E. I. Railway main line between Buxar and Moghalserai 428 miles from Calcutta.

The track is double line on a very low embankment averaging about 2 ft. only in height. There are shallow reed-grown borrowpits on each side at a distance of about 20 ft. from the toe of the bank.

The tracks consist of 88½ lb. rails 36 ft. in length laid on D. and O. C. I. sleepers at 14 per rail length.

The line is fully ballasted and is perfectly straight, the nearest curves being at a distance of 4 miles to the east and one mile to the west. There is no gradient, a slight change from level to 1 in 2000 occurring 400 ft. beyond the point of first derailment.

The track is well maintained and in good order.

Evidence and conclusions.

5. The train was running a little late. It had left Dildarnagar at 3-50 hours. According to the driver's timing the accident occurred at 3-58 hours. The Guard is not so definite but states that he looked at his watch just after the

accident and it was then 3.58. He is very shaky in all his evidence which is not very reliable. He protected his train satisfactorily but does not appear to know much else of what he did. This is not surprising considering the very bad shock and shaking up that he had received, he narrowly escaped death. At the enquiry the following day he was obviously unhinged and in a bad state. The time of the accident at the earliest can be taken as 3-58. The train had travelled 4½ miles in eight minutes and the driver's estimate of 35 m. p. h. as being the speed of the train at the time of the accident may be accepted. The track is here passed for a speed of 60 m. p. h.

The track in the rear of the train was badly damaged for a distance of 650 ft. but this was obviously caused by the derailed wheels crashing along the tie bars and on the C. I. chairs. At the beginning of this damaged track were the signs of the first derailment. This point is in mile 428 between telegraph posts Nos. 14 and 15. Up to this point from the west, the direction of motion of the train, the track was intact and in good condition.

6. The first sign of any abnormality or defect in the track was a rail lying on its side in alignment : it was at once apparent that this was due to all the inner jaws of the D. O. sleepers being missing and also the fish plates at the end of this rail. The end of the following rail was badly hammered and dented, clear evidence that the previous rail had been lying on its side prior to the passage of the train as the hammering and dents were unquestionably caused by the treads and flanges of the passing wheels. Along the full length of the web of the prostrate rail were the marks caused by the flanges of the wheels. It was from the end of this rail that the first signs of derailment commenced. It is not possible to say whether it was the brake van which failed to run true across the gap and pulled the trailing vehicle off or *vice versa.* The engine wheels attempted all of them to retain the track but two came off after having travelled about ¾ the following rail length.

7. One or two of the civil authorities were sceptical about the possibility of a train traversing such a gap. A light trolly was therefore placed on the track and propelled at about 8 m. p. h. and released. It ran the gap perfectly, its flanges taking the web of the prostrate rail, demonstrating clearly the facility with which the train passed and was not entirely wrecked.

One did not have to look far for the missing jaws and fish plates. One pair of plates was lying in the open on the edge of the nearest borrowpit only 16 ft. away. A number of the other parts were lying alongside in the water and among the reeds. There was no mark or sign of any damage on any of the parts found. These consisted of the four fish plates, all the jaws and three fish bolts. Two of the fish bolts even had the nuts re-threaded on them, a clear indication that the rail had been released by means of proper tools and probably by experienced men. All the loosened parts with the exception of 8 cotters have since been found.

8. The only conclusion possible is that the accident was deliberately caused by the malicious tampering with the track by some persons unknown.

It is noteworthy that there was a previous attempt of the same nature at almost this identical spot this year on July 5th, this occurred at mile 428-12 but fortunately it was not successful, the miscreants, who had on that occasion removed four fish plates, evidently having been disturbed.

The matter is at present in the hands of the police and of the C. I. D. but considering the number of instances of train wrecking and of attempted train wrecking that have taken place on this section of the railway it seems that some concerted action should be taken by the railway and by the police in regard to future patrolling of the line.

3. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

I. Accident to No. 4 Up Frontier Mail at Morwani Station on the 25th November 1938.

FROM THE HON'BLE H. T. DE B. BINGHAM, SENIOR GOVERNMENT, INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, LETTER No. 1899, DATED THE 14TH DECEMBER 1938. (7479-T.)

Description of the Accident.

Morwani Station is a wayside station six miles south of Ratlam on the single main line system of the B. B. and C. I. Railway and is situated at mile 401 from Bombay.

The station consists of a through or main line on the straight, a 1st loop (which is used only as a temporary siding and has scotch blocks at either end for stabling wagons) and a 2nd loop, (See Interlocking diagram* Appendix D. II). We are chiefly concerned with the main line and the 1st loop or temporary siding which is served by the up facing points No. 18 situated at the extreme north of the station yard.

2. The engine of the Frontier Mail, with the up outer, up warner and the home signals presumably correctly lowered for a run through, while alleged to have been travelling at about 35 or 40 miles per hour experienced a violent jerk and bump at the points and took the turn out to the 1st loop line followed by its tender and the leading bogie truck of O. C. 23 (a railway officer's saloon). The rear bogie truck of this saloon took the main line and the saloon literally " did the splits ". The engine jumped a scotch block on the 1st loop made from an old rail and the tender wheels and O. C. 23 ploughed up the track of the loop and badly damaged the trap points and points No. 16 leading to the 2nd loop. The rest of the rake took the main line correctly and came to rest 441 feet from the facing points.

The positions are shown on the diagram *(Appendix D. I) and may be summed up as follows :—

(*i*) Engine No. 559-H brought to rest on the 1st loop and still on the rails about 1,000 feet from the facing points.

(*ii*) The engine tender, still attached to the engine, with all its wheels derailed.

(*iii*) The front bogie truck of O. C. 23 (the first vehicle next to the engine) lying overturned on the 1st loop about 600 feet from up facing points, that is to say about midway between the engine and points No. 18.

(*iv*) The rear bogie truck, near its saloon, lying crosswise on the main line further ahead and in front of the rake.

(*v*) The wreck of the saloon, lying straggling across the " 6-foot way " and the main line, at the head of the rake and lying over the signal wires to home and outers.

(*vi*) The rake standing on the main line about 440 feet from the facing points with no vehicles derailed or damaged.

3. There were two B. B. & C. I. railway officers and servants occupying the saloon O. C. 23—Dr. Wilkinson, Chief Medical Officer of the Railway and Mr. J. N. A. James, District Traffic Superintendent. These two officers were pulled out through the windows of the overturned saloon, the body of which had been stripped off the frame and crushed and ripped to pieces. It was an extraordinary thing that both these officers and servants were not killed and suffered no external injuries. Unfortunately Dr. Wilkinson died very shortly after from heart failure due to shock. Mr. James proceeded to Bombay after the line had been cleared and sailed for England the same day. He has sent me a statement *(Statement No. 2). Only one other passenger was slightly injured.

The permanent way was restored sufficiently to enable the rake to be taken back to Ratlam and the Frontier Mail left Ratlam again at 10-30 hours the next morning the 26th November 1938.

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*Not printed.

Description of the Site of the Accident.

4. The accident occurred at the up main facing points No. 18 at the north end of Morwani station. The up approach to these facing points is on the straight, the nearest curve (2°) being 995 feet away to the north. The up approach to the station is on a down gradient of 1 in 317, a change of grade occurring 225 feet beyond the points from whence the formation is level throughout the yard. The formation of the up approach is on an embankment 3 feet in height and the station itself is in a shallow cutting. Signals are clearly visible from the station and from an adequate distance by Up trains from Ratlam.

Evidence and Conclusions.

5. After careful inspections of the site of the accident and in consideration of the evidence taken and observations and enquiries made, I find that the accident might be attributed to one of the following causes :—

(*a*) Some obstruction deliberately placed or tied on to or between the switches or slide chairs so as to cause an engine to jump the rails, or some wilful tampering with the mechanism operating points No. 18 so as to cause an accident by setting them in some half position.

(*b*) Some defect in Engine No. 559-H which caused it to jump from the switch and stock rail of the straight road on to the switch and stock rail of the turnout assuming that the points had been set correctly for the straight.

(*c*) That some object like a crow bar, iron fencing post, permanent way casting or fitting had accidentally been dropped across or into the points.

(*d*) That for some reason, other than sabotage, the facing points No. 18 were improperly set.

6. With regard to (*a*) a very careful search by a number of people in the vicinity after the accident failed to discover any object likely to have been used by some ill-disposed person to cause a derailment nor is there any evidence to show that the mechanism of the points had been tampered with. In spite of the minutest examination of all parts of the lay-out in my presence and previously in the presence of competent railway officials, no sign of any tampering was revealed.

As regards (*b*) the engine has been carefully examined at Ratlam shed. The bogie control springs were removed for my inspection on 29th November 1938 and were found intact. The bogie slide and pivot was also found to be well greased and free. The bogie control springs were sent to Dohad on the 29th night for testing. The Works Superintendent, Dohad, has returned them and reports as under :—

> " The control springs are slightly stronger than the calculated strength but are satisfactory for length ' free ' and ' home ' ".

All the engine tyres were cleaned and the treads and flanges were examined on 30th November 1938 and 1st December 1938 and the following marks were found on them :—

All the bogie and coupled right hand wheels had clear marks of the wheels having mounted some obstruction, possibly a running rail or the scotch block on the 1st loop. The left side wheels had no abnormal markings.

Attached is a blue print shewing the marks found on each wheel. (Appendix* D. V.).

The remainder of the engine has also been examined for any other defects but no defect has been found in it.

From the above indications it would appear that when the engine entered the Morwani up facing points the left hand tongue rail might have been in such a position that the left hand wheels were led into the first loop, while the right hand tongue rail led into the main. With the points in this position the right hand wheels of the engine then mounted over the right hand switch and lead rail just beyond the heel block and continued into the loop. This possibility is further discussed in paragraph 7 (*c*) below.

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*Not printed.

This engine, as its history sheet shows, (Appendix* F) came out from Dohad shops after heavy repairs as recently as the 30th August 1938 and has done 11,240 miles. She has been in daily use since this date and recently was chosen to take the Viceroy's special train. Taking into consideration all the available information I do not consider that there was any defect in this engine, nor do I consider that the driver at the time of the accident, was going at more than 40 miles per hour.

We come now to the cause mentioned in (*c*). Nothing was found anywhere near the site of the accident which might have accidentally made the engine jump the rails. I consider it very improbable that this was the cause of the accident. It is difficult to visualize where any object could drop on points so as to make an engine jump the rails and proceed along the loop.

We come now to (*d*). As this relates to some improper setting of points No. 18 a brief description of the system of working signals and points at Morwani is necessary. The signalling is Standard II and the maximum permissible speed laid down in this case over facing points is 45 miles per hour.

The following is a copy of a note given to me by the Deputy Chief Engineer, Signals, B. B. & C. I. Railway, concerning the signalling at Morwani and a description of the peculiar layout of points No. 18.

" The system of receiving an Up train, such as the 4 Up Frontier Mail, at Morwani is as follows :—

" The normal setting of the points at both ends of the yard are for the main line, and giving full isolation from the 1st and 2nd loop lines.

" As soon as ' Train Departure ' is signalled from Ratlam ' D ' Cabin, the Station Master at Morwani has signals lowered ; in the case under observation, the up main line home signal, and the up outer and warner signals.

" The correct setting of the point levers is indicated electrically to the Station Master on the Station Master's electric control. The correct setting of the point levers, and the setting of the control slide must be identical before signals can be lowered, thus ensuring that the ground frame is locked up, and cannot be tampered with.

" In addition to this safety appliance there is the usual local detection between the signals and points ; detecting the points, and the facing point locks, with the safe margin that it is impossible to lower a signal if either switch is 3|16″ or more out of its correct position.

" I understand, it has been stated that the correct signals were lowered for this Frontier Mail on the night of the 25th instant, if this is so, then the line should have been correctly set and safe for the passage of the train.

" I would, however, point out that it is the duty of the Station Master to see that his signals are correctly lowered. Only home and starting signals detect points, so that it is always possible, at all stations, where mechanical signalling exists, for a home signal to fail to respond to the pulling of the home lever, due to the fouling of the point detector, and the outer and warner signals to be lowered, because the locking is free by the pulling of the correct levers in the lever frame *vide* General Rule (B. B. & C. I. Railway Subsidiary Rule) 36 (1).

" The up main facing points at Morwani are worked on an economical principle, that is, No. 18 lever in the ground frame operates both the switches, locking bar and twin facing point locks, by means of a layout, known on this railway as Hayles' Compound Escapement, Economical Facing Point Lock, Twin Bolt Type Mechanism ; the working of which is somewhat complicated, and is as follows :—(See Appendix* D. III).

" The first movement of the ground frame lever operates the locking bar, withdraws the facing point lock, which is locking the points normal, through an escapement mechanism fitted in the centre of the track, the next or second part of movement of the ground frame lever, places the open switch tightly against its stock rail, so that both switches are now set against each stock rail respectively, the third part of the movement of the ground frame lever, moves the open switch to the open position, *viz.*, 4½″, and the fourth and final position of the Ground Frame lever, completes the movement of the locking bar, locking the points by the other facing point lock. This type of layout removes all

*Not printed.

' spring ' on the ground frame lever, and renders this lever very easy to pull and replace ".

7. I propose now to discuss the evidence concerning the following :—

(*a*) The position of the signals shortly before the accident and shortly after the accident.

(*b*) The damage to the interlocking and rodding, etc., of points No. 18.

(*c*) The damage and marks on the rails making up the layout of points No. 18.

8. With regard to paragraph 7 (*a*) we have the evidence of the driver and fireman of the train that all signals were correctly lowered. The guard of the train states he saw the outer and warner lowered. The Deputy Station Master on duty at Morwani and both pointsmen also state that all signals were correctly lowered. (One of the pointsmen Hubba is old and a rather doubtful witness). We may take it therefore that the train staff and the station staff agree that the signals were properly lowered for 4 Up Mail on 25th November 1938. All these witnesses are somewhat interested parties and the question of whether the lowering of the signals was correctly performed before the accident must remain a debatable point.

9. As regards the position of the signals after the accident there is ample evidence to show that they were all correctly " off " after the accident. Mr. Durham, Divisional Signal Engineer, who was in 4 Up mail and Mr. James, District Traffic Superintendent, both saw the signals correctly " off " some half hour or three quarters of an hour after the accident, that is to say after they had rendered help to Dr. Wilkinson. Later on numerous officers who came on a light engine testified to them being in the " off " position. I accept, therefore, that all signals were in the " off " position shortly after the accident. As a matter of fact the signal wires, being fouled by O. C. 23, had to be cut to allow them to return to the danger position. It might be argued that it was the saloon body that had lowered the signals, but even if this were so the fact that they came " off " at all proves that the detector was functioning.

10. As regards 7 (*b*), damage to the rodding and mechanism working points No. 18.—We have clear evidence to show that surprisingly little damage was done. There is evidence too that perhaps about half an hour or three quarters of an hour *after* the accident the points were examined by Mr. Durham, (Statement* No. V), Divisional Signal Engineer, Kotah, and Mr. James, (Statement* No. II) District Traffic Superintendent, Bombay, who were travelling on the train, and that they were observed to be correctly set for the Main Line and the home signal showing green. It appears therefore from the small amount of damage done to the levers and gear that the engine and the first bogie truck of the saloon jumped clear from one rail to another without, so to speak, putting a foot on the ground. There was some rather significant damage done to the locking bar of points No. 18. It had one rocker pin freshly sheared off and some rockers slightly bent down, while the top angle of the locking bar itself, forming the table, was slightly bent down and showed signs of having been pressed down by the wheels of some train. The locking bar showed more damage towards the Ratlam end. I examined this myself and there appears reason to suspect that some train recently had struck this rocker bar while it was in some raised position. The Deputy Chief Engineer, Signals, and his assistant both assure me that they get many locking bars damaged like this and that if a train had struck it in the half position there would have been much more serious damage. Nevertheless I consider the slight damage observed in excess of what one would expect from fair wear and tear and compatible with a train having struck it in some raised position. Beyond this comparatively light damage to the locking bar there was no apparent damage to the point mechanism when it was examined at daybreak next morning.

11. We now come to 7 (*c*) the damage and marks on the rails making up the set of points (see sketch* giving details Appendix D. IV). This damage was inspected by me. Starting from the toe of the switch it is observed as follows :—

(*i*) Chips of metal newly broken off the table of the right hand switch about 5 feet from the toe.

(*ii*) The right hand switch rail bent or bulged towards the stock rail, that is to the right.

*Not printed.

(*iii*) Well defined marks of wheels mounting over the right hand lead rail about 12" from the heel block and in other places to a lesser degree.

(*iv*) The right hand heel block cracked.

(*v*) The right hand loop rail just beyond the right hand stock rail dented.

It is noted that the damage is all on the right hand side and indicates that the wheels of the engine and tender jumped the right hand switch rail due to some great lateral pressure on the flanges exerted from left to right. The bending or kinking of the right hand switch rail to the right shows this lateral pressure clearly. The left hand switch is correspondingly bent slightly to the left or opposite direction.

We see therefore that the right hand switch at the time of the accident seems to have been set against or very near the stock rail and in the correct position for the straight.

Now what about the left hand switch at the time of the accident ? Beyond the heel block having been cracked there does not appear to be any score marks of mounting wheels, but there are some superficial graze marks on the table possibly caused by the rear bogie truck of the saloon. The switch is also bent or bulged slightly to the left towards its stock rail. From this very definite evidence and the marks on the engine wheels we arrive at the very strong supposition that just before the accident the right hand switch was set for the straight and the left hand switch set for the loop ; that is to say that both switches were up against their stock rails or perhaps very nearly so, and that the left hand wheels of the engine, tender and first bogie truck of the saloon took the loop switch and lead and the right hand wheels mounted over the main line switch and lead. The locking bar, just prior to the arrival of the train, was in some raised position, how much I cannot say, and received its injuries from the engine wheels striking it and deflecting it downwards.

12. If it is accepted that both switches were closed when 4 Up passed over the points then an answer must be found to one of the questions following :—

(*a*) How was the home signal lowered ?

or

(*b*) If both switches were lying in their proper positions when the signal was lowered, how came the left hand switch to close before the train arrived and to open again after the engine, tender and leading bogie of O.C.23 had cleared the points ?

Exhaustive tests and experiments made in connection with (*a*) prove that it would be impossible to lower the signal if the switches were not properly set. As regards (*b*) it was apparent that neither the initial movement nor the subsequent movement could have occurred unless some person with the necessary tools and knowledge had deliberately disconnected and afterwards reconnected three different bars.

The point mechanism is of a sturdy design and the method of throwing and locking switches although somewhat complicated is reliable. The method of detecting the position of the switches and facing point lock is similar in principle to detectors in general use in India.

13. The Divisional Signal Engineer as well as the Executive Engineer and other officers had made a thorough investigation of the signalling and interlocking arrangements at Morwani during the night and early morning after the accident.

The Chief Engineer, B. B. and C. I. Railway also proceeded to the site of the accident on 27th November and spent that day endeavouring to find out any cause for the accident, but could not arrive at a solution.

I myself visited the site before holding my enquiry, and was accompanied by the Deputy Chief Engineer, Signals. We endeavoured by numerous tests to show up any weak spots in the principal and in layout and interlocking but without success, the margins of safety were overwhelming.

After my enquiry at Ratlam I determined to have another try at Morwani and to attempt to re-construct various sequences of events and possibilities that might have happened.

With the co-operation of the Agent and General Manager of the B. B. and C. I. Railway and his Chief Engineer I called in a Signal Engineer from a foreign line in the hope that he might be able to produce some new ideas and to throw some fresh light on the matter.

For six hours on the 6th December we tried out every conceivable test, fair and foul, to induce some weakness or error in the interlocking to manifest itself, but without success. Every possible and impossible situation was reconstructed, which gave us no help, the margin of safety was too great. It was a testimonial for the whole layout of points No. 18 and its signalling as also for the efficient and sturdy material used in the construction. I could get no evidence that anything had been adjusted, replaced or repaired soon after the accident ; a very careful investigation into this point was made. There is always this possibility however.

14. In view of the foregoing it is unreasonable to suppose that any accidental fault or combination of faults could occur, which would either permit the lowering of the signals when the switches are improperly set, or permit one of the switches to open after the signal had been lowered and that this fault or faults could disappear entirely after a train had passed over the points.

What seems to be more feasible is that the driver ran past the outer and home signals, and reached the points just as they were being set to normal, *i.e.* when both switches were closed and the locking bar raised. If this did happen, the train itself would prevent the final movement of the points until there was sufficient space between two consecutive pairs of wheels. The first space of sufficient length would be that between the 2nd and 3rd pairs of wheels of O. C. 23. (The locking bar having been bent forwards and pressing the plunger towards its slot).

This theory would account for :—

(*a*) the damaged locking bar,

(*b*) the marks on and damage to the permanent way,

(*c*) the fact that the engine, tender and leading bogie of the O. C. went into the siding, while the rest of the train took the straight road, and

(*d*) the fact that the points were set correctly in the normal position after the accident.

But if this was the cause of the accident it follows that as soon as the train came to a stand, the driver must have asked the station staff to cover up his mistake by pulling the home, outer and warner levers, and they agreed to do so. As the station staff were not to blame for anything more serious than being late in setting up the route for the trains, it is extremely difficult to believe that they would agree to such a criminal proposal. It is even more difficult to believe that Pointsman Bhikka, who would still be near the points, would have run back and handed the tablet to the driver, after noticing that the driver had run past the signal at danger and the engine had gone into the siding.

Summary of Conclusions.

15. Referring to paragraphs 5 (*a*), (*b*), (*c*) and (*d*) :—

(*a*) There is no evidence to suspect sabotage.

(*b*) There is no evidence to show that there was anything wrong with the engine.

(*c*) There was nothing dropped accidentally on the points, to have caused an accident of this nature.

(*d*) I conclude from the evidence that the switches forming points No. 18 were set one for the loop and one for the straight that is in the "halft throw" position when the engine ran over them and that this was the cause of the accident.

If this really was the case it must be presumed that :—

(*i*) It was possible to replace the point lever to the normal position with the points out of order, or

(*ii*) it was possible to pull the home signal lever without lowering the signal,

or

(*iii*) it was possible to lower the home signal in spite of the points being out of order and

(*iv*) that the driver ran past the home signal and

(*v*) that the Deputy Station Master did not verify the position of his signals after pulling the levers and that the train and station staff gave false evidence.

After a very careful enquiry, I am unable to assign the reasons for the positions of the switches. Some such reason as that given in paragraph 14 might be one solution, but it can be no more than a conjecture and borders on the fantastic.

Recommendations.

16. There are some 60 sets of this type of layout, in which the switches move one after the other, in use on the B. B. and C. I. Railway between Muttra, Agra and Baroda. The motion appears to be unnecessarily complicated and might be simplified by the substitution of a stretcher bar. It is not advisable to perpetuate this type of points although they have been on the line for a number of years. I understand that they have never given any trouble beyond the extra maintenance of the many moving parts.

3. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

II. Accident to No. 4 Up Frontier Mail at Morwani Station on the 25th November 1938.

FROM THE HON'BLE H. T. DEB. BINGHAM, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, LETTER No. 187, DATED THE 10TH FEBRUARY 1939. (7479-T.).

In continuation of my previous report fresh evidence and facts have now come to light which clarify the situation very considerably. A reference to my previous report will show that in paragraph 15 (*d*) my conclusions were that the cause of the accident was due to one of the switches of points No. 18 being set for the loop line and one set for the main. This cause was fully substantiated but no reasons could be assigned for this half set position nor whether the home, the outer and warner signals were in the ' off ' or in the ' on ' position.

2. Since it is now unquestionably the case that the switches of points No. 18 were not correctly set prior to the accident the presumptions in paragraph 15 (*d*), (*i*), (*ii*), (*iv*) and (*v*) of my previous report come into acute prominence. The conjectures contained in paragraph 14 of that report are also not very far off the mark and are substantially correct. As frequently happens after an accident has occurred and an enquiry has been held, individuals concerned cannot refrain from gossiping and in this case it led the District Traffic Superintendent, Ratlam, to institute further enquiries and to submit to me a statement together with fresh statements from some of his staff. I discussed all the fresh statements now submitted by this officer with him at Ratlam on the 31st January 1939 and again on the 5th February 1939 and I have no hesitation in accepting his and those others which bear on the case. This officer has been indefatigable in pursuing these further enquiries and I wish to record my appreciation of the great help he has given me.

3. The District Traffic Superintendent, Ratlam's important statement (statement* No. 1) attached to this report should be read in full but the following is a synopsis :—

In paragraph 1 of his statement he brings out the fact that the train at the time of the accident was travelling comparatively slowly. When making my enquiry I was also struck by some of the evidence concerning the comparatively and suspiciously slow speed of the train just prior to the accident. This speed was given from 20 miles per hour up to 35 miles per hour.

In paragraph 2 he relates how he first became acquainted with the fact that there had been difficulty in pulling ' off ' the home signal at Morwani on the night of the accident.

In paragraph 3 he describes how Pointsman Bhikka, who was in charge then of the lowering of the signals at Morwani Station, confessed to him that although he could pull ' off ' the outer and the warner signals, the home signal, due to some defect, could not be pulled ' off '. He tried again in the presence of Deputy Station Master, Champaklal, but failed and was told to take the tablet out to the stand.

In paragraph 4 however this pointsman Bhikka, due to fear of reprisals, recanted his confession. Subsequently at a later date he restated the facts before a magistrate and they are now recorded in his statement.

Paragraphs 5, 6 and 7 relate to certain experiments which the District Traffic Superintendent, Ratlam, carried out at various stations on his district to find out whether it was possible, under certain conditions, for similar economical type of points to remain set for two roads with lever " normal " for one road. He finds that if the maintenance of this type of signalling and layout of points is not carefully watched Station Masters do have cases of disconcerting failures. The chief point he makes here is that if these economical type of points are not well looked after one of the switch rails might be set correctly for one road while the other switch might lag behind and not come properly out the $4\frac{1}{2}$ inches and tend to remain some quarter or half inch away from the stock rail. In this position, probably due to loss of motion in the very many moving parts, it has been known possible to slot the points lever, the locking bar remaining in a raised position. The Station Master is thus enabled to get out his Hepper's

*Not printed.

key for the lowering of the home signal. Further should the wire to the home signal be slack the home signal lever slot can be got which enables the outer and warner signals to be lowered but without perhaps lowering the home signal. I may point out here that in this type the co-ordination between the ability to lower the home signal and the correct position of the points is very safe on account of the proximity of the home signal to the points and the strong rodding used in the connections. It appears, however, that there are certain weaknesses in the co-ordination between the points and points lever situated some 300 feet away and weakness in the co-ordination between the home signal which must always " lead " and the outer signals. This latter weakness is provided for in B. B. and C. I. Railway Subsidiary Rule 36 (1) which cautions a driver not to rely on the outer and warner.

Paragraphs 8 and 9 give prominence to the fact that a points lever can be slotted at times when the locking bar is in a raised position.

Paragraphs 10 to 12 give an account of experimental examples of what must have happened at Morwani Station on the night of the accident in question. The position successfully reconstructed was as follows :—

One tongue rail tight against the stock rail and the other open half inch instead of 4½ inches, locking bar in a raised position, point lever " normal " as if set for one road, home signal at danger, outer and warner ' off '.

This reconstruction was, of course, done by faking the adjustments.

4. Turning now to the other fresh statements which the District Traffic Superintendent, Ratlam, has forwarded to me the one made by Bhikka, the pointsman at Morwani Station, is of outstanding importance. This evidence in itself explains the reasons for the accident in simple language. He states that the Deputy Station Master, Champaklal, ordered him to pull ' off ' the home, outer and warner signals. He managed to pull ' off ' all three levers but states that although the outer and warner came ' off ' the home signal did not. He states that he reported this fact to the Deputy Station Master, Champaklal, but that the Station Master told him that the Mail had already left and that he was to go quickly to the tablet stand and he himself would see to the signals. His evidence makes it clear that the Deputy Station Master took no steps to investigate as to why the home signal was not lowering properly neither did he order the throwing back of the outer and the warner signals to danger. It appears that this Station Master chanced that the home signal and the points were correctly set and was afraid to cause a delay to the mail. Concerning the other statements received they mostly corroborate the fact that there was difficulty or an inability to lower the home signal at Morwani Station on the night of the accident. There are also statements which confirm the fact that there has been from time to time difficulty with home signals at other stations on this district.

5. I am of the opinion, however, that too great a stress should not be placed on the fact that faults were found at other stations and that by manipulation the system of signalling can be put out of order. It is by no means a difficult matter for anybody with the necessary technical ability to fake adjustments and cause faulty working. The redeeming fact remains that, in this case, the home signal could not be pulled ' off ' and was, therefore, doing its job and showing that the points were not correctly set.

6. From evidence and enquiries made it is certain that Deputy Station Master, Champaklal, was aware that something was wrong with his home signal. There is evidence to show that he not only rang up the next station and informed the Station Master there of the fact but he also rang up the Assistant Controller at Ratlam and complained to him about it. It is significant that neither of these individuals came forward at the time of my enquiry to give valuable information.

7. With this fresh evidence at my disposal, it is now an easy matter to reconstruct the accident which occurred at Morwani on the 25th November 1938.

No. 4 Up Mail left Ratlam 10 minutes late and the driver must have been going fast to make up time. The outer and warner signals stand out prominently and are to be seen a long time before the home signal becomes visible, and I consider that when both these signals were seen in the ' off ' position by both driver and fireman, the latter, who was in a favourable position, failed to look out for the home signal when it came into sight on his side about a quarter

of a mile outside the outer and warner, and that the driver, who can only see this signal when level with the outer, saw that it was against him when he reached that point. He immediately whistled and the slacking of speed referred to by Mr. James in his evidence was probably due to an effort on the driver's part to stop short of this signal. But when he saw in his head light that a pointsman was standing on the tablet stand with tablet ready, he probably changed his mind and decided to risk it. Not only does the evidence of several persons prove that the mail was going comparatively slowly at the time of the accident, but the accident itself offers conclusive proof that the train must have been going fairly slowly, otherwise a more serious accident would have resulted. As a rule the up mail runs through this station at speed and there is no reason why the driver should have slowed down on this occasion, except for the reason that the home signal was against him, a fact that is conclusively proved from statements* ' J ' and ' K '.

The damage to the lock bar described in paragraph 10 of my report proves that the lock bar of the points concerned was partially if not fully in a raised position and that a lock bar will remain in a raised position under certain conditions, is fully proved in what the District Traffic Superintendent, Ratlam, saw at Bhairongarh and Medhpur Road. Paragraph 11 of my report shows that the right hand switch must have been set for the straight and the left hand switch for the loop, and that this can happen under certain conditions, is also shown in the District Traffic Superintendent, Ratlam's report. It is not possible to say, however, whether this position on the night of the accident was due to wear and tear in the gear, lost motion, or bad adjustment as by the time responsible investigations had been made the whole apparatus must have been adjusted on the sly by the Signal Department. The Sub-Permanent Way Inspector, Morwani, in his statement recorded previously by me stated that he and his Permanent Way Inspector saw the Signal Department men oiling and fiddling with the points, etc., the day after the accident.

That the home signal after the accident was in the ' off ' position as witnessed by reliable witnesses is easily accounted for. When a switch in this twin-locking apparatus does not, when the levers are in the ' full-throw ' position, come out to the full 4½ inches, this is due to wear and tear in the apparatus (lost motion in the point rodding, worn pins, etc.), and bad maintenance in conjunction with point levers being worked without force. The tendency is for the switch to spring out at a touch to the normal 4½ inches, but in this case the flanges of the engine's left hand wheels, having taken the switch set for the loop, kept the switch in that position until the gap between the front and rear bogie wheels of R. A. 23 enabled the switch to spring out, the rear bogie wheels of the saloon thus taking the straight, followed by the rest of the train. It is quite probable that the opening of the switch to its correct 4½ inches would automatically drop the signal, but in this particular case, the fact that R. A. 23 caught in the signal wires, would have unquestionably pulled off the signal if it did not drop automatically when the switch sprung open.

8. *Further conclusions to my previous report No. 1899, dated 14th December 1938.*

I. I find that on the night of 25th November, just prior to the accident to 4 Up Frontier Mail, the up outer signal and warner signal were correctly lowered but that the home signal could not be lowered on account of the incomplete setting of points No. 18 situated at the north end of Morwani Station.

II. I find that this state of affairs was due to faulty maintenance on the part of the Signal and Interlocking Department which enabled points lever actuating points No. 18 to be slotted in the normal position which thus enabled the home signal lever at the station to be released and then the levers working the outers but that this operation, while lowering the outer and warner signals, failed to lower the home signal due to its proper detection of the points.

III. I find that driver Framjee overran the home signal whilst it was at danger and neglected to observe the B. B., and C. I. R. Subsidiary Rule 36 (1), thereby causing an accident. He was no doubt greatly influenced by the fact that the outer and warner were ' off ' and that the pointsman was in his usual position with the tablet. The driver's position on the right of the engine was not particularly favourable in obtaining a good view of the home signal. This driver gave false evidence at my recent enquiry stating that the home signal was ' off '.

*Not printed.

IV. I find that 1st fireman Abdulaziz Pirbux, standing as he was in a favourable position on the left of the engine and on the lookout, must have seen the home signal at danger. He gave false evidence at my recent enquiry stating that the home signal was ' off '.

V. I find that Deputy Station Master, Champaklal, was fully aware that the home signal had not been pulled off properly and failed to throw the outer and warner signals back to danger and to make investigations. He also gave false evidence at my recent enquiry. I consider this man's conduct reprehensible and a contributory cause of the accident.

9. There has been a deplorable conspiracy amongst the railway staff of the Ratlam Division with the object of concealing the truth. Not only was this conspiracy entered into by those actually concerned in the accident but also by others indirectly concerned. There is no doubt in my mind now that those responsible for the maintenance of the signals and interlocking at Morwani readjusted the point lever rodding and signal wire sometime after the accident and that they knew the cause of the accident. Chief Signal Inspector, Kushiram, and Fitter, Rattanlal, are directly concerned with the maintenance of these points and deeply concerned in the conspiracy to conceal evidence. I am surprised that Mr. L. F. Durham, Officiating Signal Engineer, Ratlam, could not have been of more assistance to me at my enquiry. I make no further comment on this point and on the other points raised in this paragraph but leave the matter to be dealt with by the Administration concerned.

Further Recommendations.

10. Besides recommending the simplification of this type of economical layout as per paragraph 16 of my previous report I would add that I recommend the readoption of two points levers. I consider the quadrant or arc of a single lever insufficient to work four movements. The last movement, the slotting of the locking bar plunger, is the all important one in detection and with only one lever is liable to get left behind.

4. NORTH WESTERN RAILWAY.

Derailment of No. 488 Down Mixed train at mile 2|13-14 between Dilmurad and Jacobabad on the 28th February 1939.

FROM MR. P. W. WILTON DAVIES, V.D., A.M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, LETTER No. 80|T., DATED THE 24TH MARCH 1939. (7569-T.)

Description of the Accident.

No. 488 Down is the daily Van Shunting Mixed Train on the 2′—6″ Gauge, Jacobabad-Kashmor Railway, which makes connection with the Broad Gauge Train No. 192 Down from Jacobabad to Karachi City, leaving Jacobabad at 14-45 hours every day. At 14-22 hours on February 28th, 1939, No. 488 Down derailed at mile 2|13-14 between Dilmurad and Jacobabad.

2. The marshalling order and composition of No. 488 Down on this occasion was, from front to rear, Engine No. 170|S, (BESA 2-6-2) 6 covered goods wagons (all 4 wheelers) Nos. 39, 43, 47, 42, 52 and 34 ; 2 Bogie 3rd class coaches Nos. 8 and 20 ; 2 Inter class 4 wheelers Nos. 22 and 23 ; 1 Composite 1st and 2nd class 4 wheeler No. 26 ; 2 Bogie 3rd class coaches Nos. 17 and 7 ; and a four wheeler Luggage Postal and Brake Van No. 30. The total gross load behind the engine was 138 tons. There was no vacuum brake on the train, and all stock was fitted with A. B. C. central buffer couplings, which stood up very well to the strains arising from the accident.

3. A " C " class level crossing, flanked on both sides by Irrigation pipe culverts of one foot diameter, exists some 65 feet from the rear of the Brake Van of No. 488 Down, where this came to a halt after the accident.

The derailment happened while No. 488 Down was proceeding from Dilmurad to Jacobabad. The engine and the leading covered goods wagon No. 39, came to a stand 67½ feet ahead of the rest of the train and were not derailed. The three vehicles in rear, two 3rd class bogies and the Brake Van, also remained on the rails. The remaining vehicles were all derailed. The seven central vehicles, consisting of 3 covered goods wagons, 2 third class bogies, 2 Inter class 4 wheelers (from covered wagon No. 42 to Inter class 4 wheeler No. 23, inclusive) were badly derailed. Wagon No. 52, had capsized and fallen on its side to the left of the line with its leading Bissel Wheel cradle completely adrift from the under-frame. Covered wagon No. 34, was lying at right angles with its centre across the line and the following 2 third class bogies and 2 Inter class 4 wheelers were lying zig zag (concertina fashion) across the track. The bissel wheel cradles of covered goods wagons Nos. 47, 42 and 52, showed signs of having ploughed well into the soft wet mud of the formation.

4. Some 192 feet of track under the train was completely smashed up with all rails twisted and badly deformed and every bit of it covered with soft wet mud. There were clear marks of the flange of a derailed wheel on the sleepers for about two rail lengths commencing from a point 84 feet from the centre of the level crossing referred to, and under the rear 3rd class coach and the Brake Van where the train had come to a stop. These marks were the only reliable signs of derailment available and were on the inside of the track rails varying from 4″ to 7″ from the left hand rail facing the direction in which the train was travelling. There were no marks on the rails, and the fact that no wheel marks existed on the outside of the rails is explained by the outside wheel probably having been suspended by the cradle of the derailed wheel skidding along the top of the right hand rail owing to the very little clearance of these above rail level. Beyond these marked sleepers the track was too badly broken up to provide any useful evidence of the sequence of events thereafter.

5. No one travelling on the train suffered any injury or shock.

6. The track at and near the site of the accident consisted of 30 lb. F. F. rails 24 feet long laid on N + 1 Sal Wooden Sleepers laid in 1914, with earth ballast.

7. At the time of the accident the weather was cloudy and visibility fair. There had been rain on each of the two days preceding the date of the accident, and a heavy shower lasting 15 minutes occurred shortly after the accident. As a result, the formation and ground alongside (heavily impregnated with efflorescent salts) was very soft and slushy, and made the work of clearing the

line and restoring through communication a difficult one, apart from the absence of a break down crane.

8. The accident occurred at 14-22 hours on February 28th, 1939, and the engine (No. 170|S) with a memo. from the Guard and a few passengers arrived at Jacobabad at 15 hours. The remaining passengers went by foot to their houses nearby. A relief train left Jacobabad at 16-22 hours and arrived at the site at 16-40. The contents of the five leading derailed wagons were transhipped that evening, but through communication was not restored till 18 hours on March the 2nd. Nos. 487 Up and 488 Down, the daily mixed trains on this branch line, were transhipped at the site of the accident on the 1st and 2nd of March 1939.

9. The approximate cost of the damage was :—

Permanent Way	Rs.	286	1 0
Rolling Stock	Rs.	2,038	8 0
Total ..	Rs.	2,324	9 0

Description of the Locality.

10. Dilmurad is a " B " class station, 9½ miles from Jacobabad on the Jacobabad-Kashmor Railway, a 2'—6" Gauge branch line, 76½ miles long, serving a riverain area on the right bank of the Indus. The line runs in an easterly direction and lies in the Upper Sind Frontier District of the Province of Sind. Jacobabad, the Civil District Headquarters, is on the Rohri-Quetta-Chaman Broad Gauge section of the North Western Railway some 55 miles from Rohri, which is on the left bank of the Indus and is an important junction on the main Broad Gauge double line section of the North Western Railway from Lahore to Karachi.

11. At the site of the accident the line is in bank from 2' to 3' high and on the straight. The gradient is 1 in 800 falling for one quarter of a mile towards Jacobabad with short gradients of from 1 in 600 to 1 in 1,000 rising to a bridge of 1-30' girders over the Nurwah inundation canal about 1 mile from the site of the accident towards Dilmurad station.

12. Trains are worked on paper line clear on the Absolute Block System and on this occasion No. 488 Down was running 10 minutes late after being delayed at Unhar Wah (a station 30¼ miles from Jacobabad) to cross No. 487 Up of the same date. According to the Guard's journal the train continued running 10 minutes late from Unhar Wah upto the time the accident took place and no time was made up on the 28 miles run in between.

Evidence.

13. This was examined and analysed under the following probable causes of the derailment :—

(1) Obstruction on the line.

(2) Defects in the track or formation.

(3) Excessive speed or bad driving.

(4) Defects in Rolling Stock.

14. *Obstruction on the line.*—The evidence was strongly against this possibility—that of the Traffic Inspector, the Loco Shedman in Charge and the Driver of No. 488 Down is definite that no obstruction was noticed on the line nor on the level crossing just short of the site of the accident. I therefore rule out any possibility under this head.

15. *Defects in the track.*—As already stated, the track consists of 30 lb. F. F. steel rails 24' long on N + 1 wooden sleepers with earth ballast. The rails, sleepers, fastenings and gauge appeared to be all in good order. The existing type section for earth ballast in use on this line is such that it is difficult to distinguish it from the rest of the formation for the side slopes of both coincide. In the case of the type section for stone ballast, the bottom width of the ballast is nearly 8' and with the standard formation width of 10 feet a cess of about one foot occurs between the toes of the ballast and the shoulders of the formation. Further the standard earth ballast section shows a bottom width of 10 feet, and the surface of the ballast is sloped on either side at 1 in 24 from ½" above the tops of the centres of the sleepers to the shoulders which, in effect,

become the shoulders of the formation. In other words the top of the centres of sleepers in the track is only some 3″ above the shoulders of the earth ballast. As the local earth hereabouts is clayey and heavily charged with saltpetre, rain tends to unduly soften the top earth on the formation, as well as on the ground surface alongside, and, consequently, it is quite possible for the sleepers to be pushed 2″ to 3″ into the resulting soft wet earth ballast by passing trains. This makes surface drainage of the track very difficult, if not impossible. To lift and pack the track under these conditions with the possibility of further rain is likely to make matters worse in this respect, for the freshly disturbed earth ballast then becomes more absorbent and the surface drainage much more difficult to cope with. These facts are mentioned in order that a fair appreciation can be made of the evidence of the Permanent Way staff responsible, which indicated that the conditions then obtaining called for no special precautions other than patrolling, and making small cross drains to drain away surface water from the top of the earth ballast in the worst places—probably the wisest procedure under the circumstances. The P. W. I.'s evidence, confirmed by an examination of muster sheets, showed that no work was done by the maintenance gang between miles 2 and 3—the site of the accident—since the 9th February, *i.e.,* 19 days before the accident.

16. Evidence and records of rainfall with the Civil Authorities indicated falls of 36 cents on 24th February 1939, 8 cents on 26th February 1939, 32 cents on 27th February 1939 and 6 cents on 28th February 1939, which fell in a quarter of an hour after the accident occurred. These records also indicated almost exactly similar but greater rainfall two years ago : 13 cents on 24th February 1937, 8 cents on 25th February 1937 and 98 cents on 26th February 1937, with no untoward effects as far as the track was concerned. This evidence, therefore, more or less confirms the opinion of the mate, who has been in charge of this section for the last 10 years, and of the keyman, that the rain for these few days was not unusual for a district where the rainfall is notoriously meagre. The statements of the guard and driver of No. 487 Up also show no track defect of an unusual nature while passing over this length that morning some 3 hours before the accident and other evidence showed that no further rain intervened. On the other hand, my personal inspection of the track hereabouts on the 3rd March 1939, and the evidence of Mr. Booth, the Deputy Commissioner, Upper Sind Frontier, who with his wife were on No. 488 Down on 28th February 1939, as well as that of the Traffic Inspector, to the effect that the bank was sodden and soft, confirms me in the opinion that probable settlement of the track was a contributing factor to the cause of the derailment. For the speeds laid down for the section, *viz.*, a maximum of 20 miles per hour with booked speeds of 18 miles per hour, the conditions prevailing may have been safe but the factor of safety must have been considerably reduced because of the inefficient track drainage already described.

17. Under this head, therefore, I am inclined to the opinion that the track on both approaches to the level crossing, just short of the site of the accident, had settled more than on the level crossing itself and that this caused a slight hump in the track here (with possible minor humps over the pipe culverts on either side of it). As a consequence, the first wagon wheel to derail came off the track at the site of this level crossing. This assumption was more or less confirmed by lining a string through the marks, made on the sleepers by the first wheel to derail, which intersected the track rails at the level crossing.

18. *Excessive Speed or bad driving.*—Reliable evidence as regards speed was, as usual, difficult to obtain. The only witnesses available in this connection were the driver and the guard of the train who put the speed at 15|18 miles per hour—they were, naturally, interested persons and their evidence in this respect should, therefore, be treated with reserve. Mr. Booth, I.C.S., the only other witness in this respect did not take particular note of the speed, but, in a relative sense, he states that he felt that the train accelerated down the gradient on the Jacobabad side of the Unhar Wah Canal, which is about 1 mile from the site of the accident, and it is likely that it continued at this speed. There is also the fact that the train was running 10 minutes late and thus making a possible short connection with the main line train, No. 192 Down, from Jacobabad. The probable loss of time in climbing upto the level of the Unhar Wah bridge on Kashmor side, owing to engine trouble, gave the practically continuous falling grade thereafter for about 3 miles into Jacobabad, a much too tempting aspect to a driver who was running late and had to make

up as much time as he could. Lastly, although the train was non-vacuum, the condition and the position of the derailed vehicles would indicate that the train must have been travelling at a much higher speed than 20 miles per hour.

19. As regards the handling of the train, there was the possibility that something on the level crossing, close to the scene of the accident, may have caused the driver to apply his brakes suddenly and thus cause a derailment in the conditions prevailing at that time. The evidence available, however, indicates that there was nothing on, or near, this level crossing so that this contingency can be ruled out. Assuming, therefore, that the driver applied his brakes as soon he felt the lurch over the level crossing, he brought his engine to a stand (helped very considerably by the jerks of the severely derailed wheels ploughing well into the soft formation) within about 450 feet therefrom. It must be remembered that owing to boiler trouble the steam pressure was much below working pressure at the time and this must have reduced the effectiveness of the steam brake on the engine. In order, however, to get some idea of the effectiveness of engine steam brakes on a non-vacuum train of similar load, I carried out a test near the site of the accident on No. 487 Up on 4th March 1939 with the train travelling at about 20 miles per hour, when it was brought to a stand within about 622 feet of the point where steam was shut off and the brake applied. An examination of the surface of the rails, however, showed that effective brake action in this case was in the last 200 feet of this distance only.

Considering all the facts under this head, therefore, I cannot help but feel that No. 488 Down was travelling at a higher speed than 20 miles per hour on the day of the accident—probably 25 to 28 miles per hour.

20. *Defects in Rolling Stock.*—In considering this question it is necessary to refer briefly to the type of wheel suspension existing on the 4 wheeler goods stock on No. 488 Down on this occasion. This consists of a revolving Bissel plate connected by a bogie pin to the under frame (each of which is eccentric to and outside of the wagon wheels) and a cradle, consisting of both axle guards rigidly attached to the sole bars and to each other, which is suspended by chain links to the ends of the ordinary type of plate springs bearing directly on the axle boxes. These chain links are attached to the cradles at points on the cross bars roughly midway between axle guards and the outside faces of the wagon wheels and the clearance of the cradles above rail level is very small. The axle guards also have a very loose fit in the axle box guides. The whole, therefore, forms a very flexible system of suspension suited to very sharp curves of the order of 2 to 300 feet radius with consequent low speeds. Perhaps too flexible for the combination of circumstances that arose just before the derailment occurred. The sharpest curve radius on the Jacobabad-Kashmor Railway is 764 feet.

21. It is also useful to note that the diameter of the wagon wheels outside flanges is 2′—1″, whereas the spacing between adjacent edges of sleepers in the centres of track panels is anything from 2′—6″ to 2′—8″—thus permitting a wheel to plough well into the soft earth ballast between sleepers when slowing down and when the cradle of the derailed wheel gave way : which I feel, is what eventually happened in this case.

22. As regards the condition of the stock, owing to the state of the goods stock that was derailed, no direct evidence of any mechanical defect likely to cause a derailment was available nor possible. The P. R. O. statement attached* indicates that of the 5 wagons badly derailed, Nos. 42 and 43, which were considered for breaking up in the past year or two were due in shops in November 1939, after 3 years in service, and were repacked and oiled in February 1939. No. 47 was just overdue shops, and had no date for oiling. No. 52 was just due for shops and was last oiled on 12th February 1939, and No. 34 was due shops in April 1939, and was last oiled on 18th February 1939. The period laid down for the periodic overhaul of Narrow Gauge goods stock in the Rolling Stock Manual is 2 years, whereas in this case 3 years was in force. Of the 4 passenger vehicles badly derailed, the first three were not due shops for another year and the last in October 1939—all were repacked and oiled a month before the accident and all the coaching stock was in good condition. Of the four wagons mentioned, No. 52 was damaged the most—its leading wheel with Bissel cradle suspension was completely adrift and the latter very much bent and knocked about

*Not printed.

The bogie pin attaching the revolving plate to the under frame was sheared off and there was a dent 5|16″ deep and about 6 inches long under the left hand central longitudinal where the guide on the upper side of revolving plate had evidently very severely fouled this. All this damage could quite possibly have been caused by this particular wheel ploughing into the formation between two track sleepers after derailing and thus jerking itself and the following vehicles to a sudden stop. I am not prepared however, to say that wagon No. 52 was the first to derail nor to assign the actual cause of the derailment to these defects, but all the evidence available would indicate that this wheel, the leading wheel, of wagon No. 52, was the first to get wedged between track sleepers, and eventually caused the other vehicles on either side of it to derail in the serious manner described. The fact that this wagon was just due shops and the one, No. 42, in front of it just overdue shops and was recently considered for breaking up, also their flexible suspension and general condition may, however, have contributed towards the cause of the derailment due to one or the other being unequal to the lurch caused by the settlement of the track on either side of the level crossing just short of the accident, and where the driver's evidence would indicate that he first felt the jerk after which he shut off steam and applied his brakes. The wagon, No. 34, in the rear of No. 52, which was being used as a C. R. Van and was lightly loaded with only seven packages, may also have been a contributing cause, as the jerk combined with the sudden application of the driver's brake and the extraordinary flexibility of the wheel suspension already referred to may possibly have caused this to be pinched up off the rails. On the other hand wagon No. 42, also considered for breaking up in the past few years, was stated to have been loaded with 125 bags of rice ex-Kandhkot—some 50 per cent. more than the 85 bags of rice loaded in wagons Nos. 43, 47 and 52, which constituted a full load for this type of wagon—*i.e.*, 8 tons.

Conclusion.

23. A consideration of all the factors referred to above leads me, therefore, to believe that the accident was caused by one of the wheels of either of the five wagons Nos. 43, 47, 42, 52 & 34, derailing at or near the level crossing just short of the site of the accident, and that this eventually caused the derailment of one or more wagons next to it till the leading wheel of wagon No. 52 ploughed well into the ballast and formation between two track sleepers thus causing a sudden and violent jerk. As a result the coupling gave way between the first wagon, next to the engine and the next wagon No. 43, the following 5 wagons and four passenger coaches in the centre of the train got badly derailed and damaged, and, in the process, the track, ballast and formation was badly ploughed up for a distance of 190 feet under these.

24. The initial derailment must have been caused by an unfortunate combination of the following circumstances :—

(*a*) Settlement of the track due to rain on either side of the level crossing causing a lurch thereon.

(*b*) Rolling Stock which probably had several minor defects of the nature and for the reasons stated in paras. 20 to 22 above—making them unequal to the conditions stated in (*a*). These defects were probably accentuated by the over loading of wagon No. 42, and the comparative under loading of wagon No. 34, referred to in para. 26 above.

(*c*) Speed of the train being in excess of the speed limit laid down, probably an excess which would have been without danger during dry weather.

25. Apart from excessive speed, for which the driver, Allah Dino, is to blame, I do not think any one of these factors involved culpable negligence that can be imputed to any one responsible person in the circumstances described.

Recommendations.

26. Arising out of this accident I would recommend the following for consideration by the North Western Railway :—

(*i*) A modification of the standard section for earth ballast for 2′—6″ gauge lines. This, I think, should conform more or less to that laid down for stone ballast. In addition, for the Jacobabad-Kashmor Railway, and other earth ballasted lines of similar economical standards suited to the light train services obtaining there-

on, I would recommend the use of cinders in the earth ballast in sections where there are signs of salt petre, or other efflorescent salts : especially is this important for the approaches to level crossings and culverts and bridges where inadequate or no earth cushion is provided. The cinders should, perhaps, be laid while the earth ballast is damp at the end of the rainy season and thoroughly worked into it ; and, at the same time, the shoulders of the formation in such sections should be rounded off to improve the surface drainage of the track.

(*ii*) A more judicious use of goods stock on mixed trains. It would be better that such are all marshalled in rear of the passenger stock but I appreciate the operating difficulties involved. It should not, however, be difficult to avoid the use of goods stock on mixed trains which is shortly due for shops and confine their use to goods trains only. Goods stock used as C. R. Vans should always, I think, be in the rear of a mixed train as these are usually very lightly loaded, and as such are a possible source of danger when marshalled inside of loaded, or passenger, stock on any train whether " Vacuum " or " Non-vacuum ".

(*iii*) Investigation into the reasons for loading wagon No. 42, in the way mentioned at the end of para. 22 above—if the information supplied to me in this respect was correct—and dealing with the person or persons responsible in a suitable manner.

L24RB—400—24-6-39—GIPS

PRB. 23, 26(N).
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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 30th September 1939

OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

No. 26

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1. MADRAS AND SOUTHERN MAHRATTA RAILWAY.

Derailment of No. 62 Down Sholapur Passenger train between Nimbal and Indi Road stations on the 1st April 1939.

FROM LT.-COL. R. E. GORDON, R.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 7, BANGALORE, LETTER No. 39/120, DATED THE 20TH APRIL 1939. (7607-T.).

1. **Description of Accident.**—On the 1st April 1939, No. 62 Down Sholapur Passenger train left Nimbal station at 15-59 hours, 6 minutes late, the next stop being Indi Road, a run of $8\frac{1}{2}$ miles. The load was eight passenger bogie coaches, the usual load being seven bogies. The train consisted of locomotive No. Y. K. 657 and in order from the engine,

Inter, Brake and Luggage comptt. .	2237	I, II and Inter Class carriage	309
III, Brake and Luggage bogie .	2146	Third Class	5968
III Class carriage . . .	1770	III, Brake and Luggage .	1850 and
III Class with female comptt. .	5971	III Class and $\frac{1}{2}$ postal van.	1999

The train was fitted with vacuum brakes throughout.

2. The booked speed of the train is 25 miles per hour and maximum permissible speed 30 miles per hour. The train was travelling at a speed probably in excess of 30 miles per hour down a grade of 1 in 100 on the straight when, at mile 139/16, about $2\frac{1}{2}$ miles from Nimbal, at about 16/6 hours, the last four bogie coaches derailed of all wheels in a cutting and came to a stop in about 430 feet.

The engine and four leading coaches remained on the track. The fifth and sixth coaches were derailed to the left with all right wheels between the rails. The seventh and eighth coaches derailed to the left with all wheels clear of the track. These two coaches were prevented from capsizing by the side of the cutting along which they were dragged, damaging the coach work on the left side.

3. The track in rear of the train from mile 139/16, the point at which the first evidence of derailment was discernible, to mile 139/17, the point where the second derailed vehicle stopped, was badly displaced and the steel trough sleepers were badly dented and rails distorted. The track in rear of the point of derailment was in normal condition.

4. The fact that the derailment occurred in a cutting prevented more serious damage. Two passengers complained of minor injuries and the guard and ice vendor also suffered minor bruises. First aid was rendered at site. The damage is estimated at about Rs. 5,000 to rolling stock and Rs. 1,300 to permanent way and cost of diversion.

5. After transhipping passengers, mail bags, etc., from the derailed vehicles into the four leading coaches, the guard sent these coaches on with the driver and brakesman, at 17-30 hours, to Indi Road station, where they arrived at 17-55 hours bringing with them the guard's accident report. The break-down train from Hotgi with a 5-ton crane arrived at Indi Road at 22-37 hours on the 1st April. The Gadag break-down train reached Nimbal at 4-55 hours on the 2nd April. Transhipment was arranged on the 2nd April until the diversion round the damaged vehicles was completed at 15 hours. No. 62 Down Sholapur Passenger was the first train to restore through communication at about 16-15 hours on the 2nd April.

6. **Description of site of Accident.**—The line from Nimbal station, mile $137\frac{1}{4}$, to the site of the accident is straight except for two 2° curves, one right handed, at mile 137/13—138/3, and one left handed at mile 139/3-8. From Nimbal northwards are short grades of 1 in 100 down,

then level followed by 1 in 100 up and ¾ mile of level to mile 138/15. From this point the grade falls at 1 in 132 to mile 139/1/8 followed by 1 in 100 down to mile 140/0. The derailment occurred in a cutting 25 feet wide and about 3 feet deep at mile 139/16 and 6 feet deep at mile 139/17 where the train came to rest. The sub-soil in the cutting is of soft rock overlaid by decomposed rock. The track is metre gauge and consists of 41¼ lb. rails, 23′-9½″ long, of Cammel Sheffield toughened steel 1880. 20K, I. S. R. The rails were laid in 1884 on steel trough sleepers, 9 per rail length, and are held to the same by 4 plain lugs pressed out of the sleepers and by two steel keys on the outside of the rails. The track is ballasted with moorum.

7. **Evidence.**—The evidence obtained from the witnesses examined was of little assistance in determining the cause of the accident or as to which vehicle was the first to derail.

From the evidence and from personal observation, the condition of the train and track after the derailment was as follows :—

The derailment of each vehicle from the front was progressively worse. The first derailed coach had all right wheels of its bogie trucks between the rails and not further from the right rail than the centre of the track. The second coach also had all right wheels between the rails, but those of the rear bogie truck were jammed against the inside of the left rail. The third coach had all wheels clear of the track and the rear portion was leaning against the side of the cutting. The rear half of the body work was slightly damaged by being dragged along the cutting face. The leading end was closer to the track than the rear end. The fourth coach had all wheels clear of the track and was leaning over against the side of the cutting. The leading half of the body was badly damaged along the left side, while the rear portion was much less damaged.

8. The track on which the engine and four leading bogies were standing was undamaged. That under the first two derailed bogies had sleepers dented and rails slightly out of straight. Behind these carriages the track was more and more distorted and damaged. The first sign of derailment appeared at mile 139/16, where the leading end of the left rail (in the direction of the train) referred to as No. 1, was badly bent at 1½ sleeper spacings from the joint. The joint was intact, but the next rail ahead, No. 2, had collapsed outwards on its side and had twisted the joint inwards, partially twisting the end of the bent rail and cracking the inside fish plate. No. 1 rail showed deep marks of seven wheel flanges having mounted and crossed it at the bend. The joints are staggered by 3′-10″ at this point due to creep. The second rail had collapsed outwards and showed marks of one wheel flange having run down the web. The leading joint of this rail was broken. The two fish plates are said to have been found near the joint both on the outside or to the left. The fish bolts were missing, but subsequently three broken bolts were found buried near the joint, the bolt heads being between the rails, and the screwed ends, with nuts attached, on the outside of the left rail. Two of the bolts bore signs of having been sheared off while the third showed a clear brittle break. There was no sign of the bolts having been broken by blows of a hammer but the nuts or screwed ends showed marks such as would be made by a wheel flange. The first sleeper (steel trough) of the 2nd rail bore marks of three derailed wheels and subsequent sleepers had more marks, the 6th sleeper having ten or more wheel marks between the rails varying from close to the inside of the right rail to close to inside of left rail. The sleeper ends outside left rail No. 2 were battered down into the earth ballast. The third rail on the left side was more or less in its normal position. Its rear end at the broken joint was badly battered on the outer edge by the banging of the end of the 2nd rail and on the inner edge by several blows from derailed wheels. The track ahead of the 5th rail was badly displaced, sleepers being severely dented and displaced and rails buckled but joints intact. The buckled rails showed no sign of wheel flanges having crossed

over them but there was one such mark on the end of second rail near the broken joint and another such mark appeared on the 4th or 5th rail which had been removed for the diversion.

9. The evidence shows that prior to the derailment the track was in normal condition. The permanent-way gang had picked up slacks and straightened the track only the previous day and on the 1st April was working at mile 140/7. The keymen had examined the track at 12 hours and again at 15-30 hours, half an hour before the accident. The Permanent Way Inspector had passed over the site by train the same day and by trolley on the 27th March. The previous train passed at about 12-45 hours in the same direction. The driver of No. 62 Passenger noticed nothing wrong with the track and felt no sway or jolting nor did the brakesman in the second bogie. The engine crew and brakesman became aware of the derailment after feeling a severe check from the rear. An examination of the track in rear of the first signs of derailment shows that the track was in average condition. The rails are held to the sleepers by two steel keys. These keys can only be driven in one direction and unfortunately this direction does not make them effective in resisting the creep of either rail. The joints are 3′-10″ out of square; the left rail looking down the grade has crept forward by 2′-5″ and the right rail has crept up the grade by 1′-5″. Creep is said to have been last adjusted in August 1937 and expansion spacings of joints to have been adjusted in October 1938. The result of this creep is that the keys are difficult to maintain in a tight condition and are slightly loose, but none were missing. Some of the joint spacings were jammed and some open, as shown in Appendix C, when checked by the District Engineer, but the condition may have been worse at 16 hours. The weather was hot, about 100° in the shade, and the accident occurred at about 16 hours when the rails had just started cooling. The lugs of the sleepers are weak and occasional lugs are broken; a few sleepers have been replaced by a stronger type. The gauge was good varying between 1/16″ tight to 1/16″ slack. Levels were fairly good varying between 1/8″ high and 1/8″ low. Higher up the grade at about mile 139/12-14 the rails show that severe breaking usually takes place there. The cutting is through decayed soft rock with a good foundation and earth packing. The rails are fairly lively under a passing train. They were laid in 1884 and had lost, in 1935, about 7 per cent. in weight in mile 139 and about 5 per cent. average loss for the branch.

10. The rail showing first sign of derailment had outer lugs missing from the 6th and 9th sleepers from Nimbal end, and the lug of the 8th sleeper was bent outwards showing a small fresh crack. The joint was therefore a weak spot and might be expected to give way outwards under some abnormal stress. Actually this joint is bent inwards. The opposite rail was not bent. The track in rear of the point of derailment showed no signs of buckling.

11. There is no reliable evidence as to the speed at which the train was travelling prior to the derailment.

12. The accident occurred at about 16-6 hours and evidence shows that there were serious delays on the part of the guard and station masters, Nimbal and Indi Road. The guard did not despatch the engine and four sound coaches until 17-30 hours, nor did he write his accident report until then, although the gang mate was available to take a message to Nimbal only 2½ miles distant. He also failed to protect his train in rear until some time after 17-30 hours. The train was inadequately protected from the front by the fireman failing to carry out the driver's instructions in that he did not place detonators on the rails but walked along the line to Indi Road station six miles away.

13. Station masters, Nimbal and Indi Road, failed to take prompt and effective steps to discover the cause of the non-arrival of 62 Down.

14. Station master, Indi Road, delayed half an hour in attempting to despatch his all-concerned message and there were serious delays in telegraphing.

15. The iodine bottle in the first aid box was empty, but the ice-man appears to have had a supply.

16. **Conclusions.**—The possible causes of the derailment may be stated as follows:—

(a) Some obstacle on the track.

(b) Malicious tampering.

(c) A mechanical defect of some vehicle.

(d) Track defect such as buckling, slack joint or kink.

(e) Excessive speed or bad driving.

17. No evidence has been obtained to suggest that there was any obstacle on the track, except the statement of the brakesman that the jerk he felt was as if the wheels had run over a bolt. He had not mentioned this in either of two statements prepared by him prior to the enquiry. The keyman and driver say the line was clear and no portion of rolling stock, such as might have caused the derailment, has been found; I therefore rule out cause (a)

18. The original accident report mentioned sabotage as suspected by the train crew. This was based on the position of the fish plates and the absence of the bolts. These broken bolts having been found with nuts in position and obviously broken by derailed wheels, I am definitely of opinion that the accident was in no way due to sabotage and rule out cause (b).

19. The vehicles which derailed have not yet been fully examined for defects, but up-to-date the only defect in the under-carriages was found in the first derailed bogie of which the elliptical springs of the leading bogie truck had come out of their seatings on the bogie truck. It would appear, however, that this was probably caused by the derailment and it is unlikely that this bogie could have run from Gadag in that condition. Wheel flanges of all bogies examined were in good condition and wheel gauges accurate. Pending any discovery of a defective vehicle, which subsequent examination may disclose, I rule out cause (c) while remaining suspicious of the fifth vehicle.

20. The condition of the track has been fully described in paragraphs 8 & 9. It is weak but fit for speeds up to a maximum of 30 miles per hour. The 'Y.K.' type of engine has been used on this branch for about seven years and has the reputation of being rough on the track. Attempts are being made to reduce oscillation by an experimental type of coupling between engine and tender.

The existence of creep, closed joints, fairly high temperature, weak lugs of sleepers, missing lugs, loose keys, light rails which have lost about 7 per cent. of weight and earth ballast, all make the track unsuitable for high speeds, especially with a rough riding engine. In my opinion however the condition of the track was not such as would in itself cause a derailment on the straight at 30 miles per hour. The conditions however were such as to suggest that the line might buckle under severe stress.

The track in the neighbourhood of the accident was packed and straightened only the day before the accident and is on a better foundation than the average for the branch, much of which is on black cotton soil. The loss in weight of the rails on M. 139 was reported to be 7 per cent. in 1935 while the average for the branch is said to have been 5 per cent. in 1935. The rails at mile 139/13 were, from my observation, much more worn by heavy braking than at mile 139/16 where there are no such signs of braking. Apparently drivers are accustomed to run freely there with a view to negotiate the half mile of up grade of 1 in 165, commencing at mile 140/4. This is supported by the Hallade record of 28th March 1939.

The Permanent Way Inspector states that he has more severe creep at other places on this branch line and it may be presumed that the track where the derailment occurred was a fairly average sample of track. According to the Permanent Way Inspector it is better than average.

21. I have endeavoured to determine which vehicle was the first to derail and the cause of the derailment. It is clear that the last two coaches were violently derailed by the bent and twisted rail referred to as No. 1. The presence of the marks made by ten derailed wheels within 15 ft. of the bend proves conclusively that the eighth coach was not the first to derail. It is clear that the severe bend in rail No. 1, with the joint bent inwards, could not have occurred while the engine and four leading coaches passed over it, as they could not have escaped derailment. Nor could it have occurred under the fifth or sixth coach, without causing them to derail more seriously. It is obvious that this severe bend was caused by the collapse outwards of rail No. 2 next ahead of rail No. 1 on the left side of track. This collapse occurred after joint No. 2 had been broken by a derailed wheel shearing off the fish bolts of which there may have been only three. The fish plates show no sign of twisting. It is clear, therefore, that a simple derailment of one bogie truck occurred somewhere in the rear of joint No. 2, probably near the end of rail No. 1, or possibly on rail No. 2. The left hand wheels remained close to the outside of rail No. 2 and after damaging the sleeper ends sheared the fish plates of joint No. 2. Rail No. 2 collapsed outwards probably under the fifth coach and this caused the twist inwards of joint No. 1 and the bend in rail No. 1. The bend was accentuated by each successive pair of wheels causing the severe derailment of the trailing bogie truck of the seventh coach and both bogies of the last coach. These coaches were flung violently to the left, buried their left wheels in the earth and capsized to the left, until arrested by the slope of the cutting. The rear end of the seventh coach, or the leading end of the eighth coach, struck the slope of the cutting just one coach length from the point of derailment. It is, therefore, most unlikely that the seventh coach was the first to derail. It seems probable that the sixth coach, if not already derailed by the collapsing of the second rail, was pulled off by the seventh coach and may, in turn, have pulled off the rear bogie truck of the fifth coach. In my opinion the derailment occurred in the above sequence, the leading bogie of the fifth coach being the first to derail. The sixth coach was not so badly derailed as to cause the derailment of the leading bogie truck of the fifth coach. The marks of the two derailed wheels, which kept close to the inside of the right rail, continue from the first sleeper of 2nd rail to where the leading bogie of fifth coach came to rest and support the theory that this was the first to derail.

22. Alternatively a kink developed in rail No. 1 between the fourth and fifth coaches which was sufficient to derail each wheel in turn; but as this would have caused 16 wheels to derail at the same place there should have been more than 10 marks of derailed wheels on the sleepers of rail No. 2 and I prefer the first explanation.

23. I have stated that the condition of the track was such as to suggest the possibility of buckling. In my opinion the distortion of the track in rear of the wrecked train, which bore strong resemblance to having buckled, was actually caused by the denting and displacement of sleepers and track by the rear bogie truck of the 6th vehicle and leading bogie truck of the 7th vehicle after derailment. These rails show no signs of having contributed to the derailment. In rear of the point of first derailment the track is in perfect alignment while ahead of this point for several rail lengths there is no sign of buckling having occurred. Had the rails been under severe stress when the train arrived. buckling would be most likely to occur just ahead of the engine, where the rails were free to move, or under the engine, or the leading vehicles. It was unlikely to occur between

the trailing bogie of the fourth vehicle and leading bogie of the fifth. In my opinion the track did not buckle in the ordinary acceptance of the term.

24. There remains the question as to whether the speed at which the train was travelling was excessive and what part it played in the derailment. I am not prepared to accept the driver's estimate that the speed was 25 miles per hour. He stated that it was not necessary to run at a higher speed than that to keep time and only when pressed did he admit that occasionally he might run up to 28 or 29 miles per hour. He also considered that if he allowed his train to coast unchecked down a long grade of 1 in 100, it would not attain a higher speed than 30 miles per hour. Nor do I accept the speed estimates of any of the train crew, who were obviously supporting the driver. In the driver's favour is the fact that he did not blame the accident on the track. However his description of how he first found the fish plates is not supported by other witnesses. In 1931 a derailment occurred on a down grade at mile 147 and high speed was found a contributory factor in the cause. In November 1938, a Hallade record shows that No. 62 Down reached a speed of 42 miles per hour down a similar grade at mile 151-152 and three days previous to the accident, a Hallade record shows that No. 62 Down was travelling at 35 miles per hour at mile 140, after a fairly severe check at mile 139/6. On the 5th April 1939, the District Engineer checked the speed of No. 62 Down at 37 miles per hour down a similar grade. On the 5th and 7th April, 1939, I checked two passenger trains over about 50 miles of the track and came to the conclusion that drivers with loads of more than seven bogies crawl up the steep grades at 20 miles per hour or less and, when running late, drive at 30 miles per hour on the level and up to 37 miles per hour on down grades. If they do this when the Senior Government Inspector is on the train, it is likely to be their normal practice to attain even higher speeds. On the 1st April, 1939, No. 62 Down left Bijapur 6 minutes late, due to an extra bogie having been attached. The driver lost no time up to Nimbal and was aware that he was permitted to run at 30 miles per hour to make up time. In my opinion he ran normally, that is to say, he exceeded the speed limit on down grades between Bijapur and Nimbal and was, in all probability, driving at about 35 miles per hour at the time of derailment. The track is not fit for higher speeds than 30 miles per hour and, unless speeds are more effectively checked, more accidents are likely to occur.

25. **Finding.**—In my opinion, therefore, the accident was most probably due to a weak spot in track which is not in first class order, the rails having lost 7 per cent. of weight, sleepers having weak lugs, some of which are broken and there being excessive creep, with jammed joints. The weak spot, probably a weak joint at mile 139/16, may have been discovered by the engine, which was in all probability running at a greater speed than permissible, and developed a kink which became sufficiently serious to derail the leading bogie of the fifth coach. The derailed wheels sheared off the fish bolts of the joint about 25 feet ahead of the probable point of derailment. This and damaged sleeper ends subsequently caused the rail to collapse outwards and to twist the preceding joint inwards causing a severe bent in the preceding rail. This bend caused a violent derailment of the two rear coaches which capsized to the left almost immediately and probably pulled off the sixth coach and trailing bogie of the fifth coach. There is positive proof to show that drivers often exceed speed limits down steep grades in the neighbourhood and that No. 62 Down is a frequent culprit in this respect. In my opinion the speed of the train was excessive on the 1st April also and was a contributory cause of the accident.

26. **Recommendations and observations.**—(1) That effective steps be taken immediately to restrict speeds to an absolute maximum of 30 miles per hour and that the time table be carefully revised. The orders issued to drivers after the Hallade record had shown speeds up to 42 miles per hour, in November 1938, have not proved effective.

(2) That creep, beyond certain limits, should be regularly adjusted before the hot weather.

(3) That sleepers with broken lugs should be replaced and all joints provided with four fish bolts.

(4) It is suggested as advisable :—

That the iodine bottles in first aid equipment be more frequently examined and that steps be taken to ensure that staff are aware of the urgency of reporting accidents without delay.

2. BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Light engine No. 347-H running into a motor lorry at level crossing No. 321 (mile 243/22) between Makarpura and Vishwamitri on the 28th April 1939.

FROM MR. J. C. O'NEILL, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 5, BOMBAY, LETTER NO. 863, DATED THE 12TH MAY 1939.

(1000-T. T.).

I beg to report for the information of the Railway Board that on the 28th April 1939 a light engine collided with a lorry at a level crossing at mile 243/22 between Makarpura and Vishwamitri on the B., B. & C. I. Railway Main Line between Surat and Baroda.

2. Full responsibility for the accident was accepted by the Executive Engineer, Baroda, and it was decided to await the preliminary report. On receipt of this a visit to the site of accident seemed necessary and as it had been noted that revised General Rule 229 had not yet been issued by the Administration an enquiry was called on the 8th May at Baroda.

3. I visited the site of accident on the morning of the 8th and then proceeded with the enquiry at Baroda Station. The following Officers attended :—

(1) P. Agarwal, Esq. . . .	Acting District Loco. and Carriage Superintendent, Ahmedabad.
(2) L. A. Desai, Esq. . . .	Acting Executive Engineer, Baroda.
(3) M. D. Sethna, Esq. . . .	District Traffic Superintendent, Bulsar.
(4) F. Moseley, Esq. . . .	District Traffic Superintendent, Ahmedabad.
(5) Khan Saheb Karanjiawala .	Deputy Superintendent of Police, Residency, Baroda.

4. Mr. Moseley was at Baroda on duty at the time of the accident and on hearing of it proceeded immediately to the site to see if any eye-witnesses could be found but says he arrived shortly before Mr. Desai, the Acting Executive Engineer, Baroda, and there appeared to be no eye-witnesses other than those involved in the case.

5. **Description of the Accident.**—At about 13-35 hours on the 28th April 1939 Light Engine No. 347-H. Class ex-Parel to Baroda collided with Motor Lorry No. 732-Baroda at Level Crossing No. 321, mile 243/22 between Makarpura and Vishwamitri and about 1 mile from Vishwamitri.

6. The lorry loaded with cement and loose dust had previously been across the level crossing and was returning with 10 bags of bone dust after unloading the cement when it was run into by the engine.

7. As a result of the collision the lorry was thrown off to the left of the line as shown on the diagram* and the driver and two coolies were killed, two other coolies being injured. There was no damage to Permanent Way and minor damage to cow catcher of engine.

8. The injured men were taken on the light engine to Baroda for medical attention and after being treated by the Assistant Medical Officer, Baroda, were removed to the State Hospital where one of the injured men died shortly after admission.

9. The names of killed and injured were :—

(1) Lorry Driver Payaj Mohamed, killed.
(2) Coolie, Mathur Sana, killed.
(3) Coolie, Masukh Gamaji, killed.
(4) Coolie, Dabhai Bhula, injured since died.
(5) Coolie, Nana Raghnath, injured.

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* Not printed.

10. **Description of the locality.**—The level crossing gate is classified as "C" and has a single leaf gate 10 ft. wide on each side of the track, wicket gates are provided for foot passers. The gates are closed by sliding bolts with hasps which work into the upright rail gateposts and are secured by a lock and key. No lights are provided.

11. The road is a kutcha cart track joining the villages of Wadsar and Manjalpur. The road from Wadsar approaches the level crossing at an acute angle then turn sharp to go over the level crossing and after the level crossing again turns to an acute angle.

12. The level crossing is practically level and metalled between the gates. The ramp approach to the crossing from Wadsar is about 1 in 6 and it drops at a flatter grade on the opposite side. No road signs are provided.

13. The gate is manned by a single gatekeeper but traffic over the road is light. From enquiries approximately 4 motor lorries, 20 carts, 50 cyclists some of whom carry milk cans, and some cattle are the average amount of traffic. Most of this traffic passes in the day time.

14. The railway is straight for a long stretch ($1\frac{1}{2}$ miles and over) on both sides of the level crossing. The road here though it runs at an acute angle to the railway is not easily visible owing to trees, bushes, cactus hedges intervening and the road being partially in a cutting.

15. For a lorry approaching from Wadsar the driver would be able to see the level crossing gate from a distance of about 120 ft. His back would be towards a down train and he would not have a good view of any approaching train till he reached the turn about 45 feet from the gate. He would also not come into clear view of the engine till he reached this point.

16. **Evidence.**—Statements of the persons concerned and present at the site of the accident had been recorded and I did not consider it necessary to recall any except the gatekeeper for re-examination.

17. Under revised General Rule 229, not yet issued, the normal position of level crossing gates should be closed and securely fastened against the road unless under special instructions for any level crossing or class of level crossings as may be laid down by the Railway Administration. The gates shall only be opened when it is necessary and safe to open them for the passage of road traffic.

18. Under the old General Rule 229, which is still in force the normal position of level crossing gates is not definitely laid down except in the case of gates that close across the line and when there is no gateman specially on night duty at a level crossing. It is further laid down that when gates are closed for the passage of trains they shall be securely fastened across the thoroughfare until the train has passed and when the gates are open for road traffic the gateman shall be prepared to show a danger signal to any approaching train.

19. The old General Rule 229 is further amplified by Subsidiary Rules issued by the Railway Administration and still in force; and in Subsidiary Rule 229 (2) it is laid down that during the day when for any reason a gateman is not in actual attendance on a level crossing and when an efficient substitute has not been provided the level crossing gates should be securely locked across the road.

20. Both gates were open immediately after the accident as stated by the driver and 2nd fireman and admitted by the gatekeeper. There is no doubt that they were open at the time of the accident.

21. It was suggested that the gates may have been opened by the injured coolie. In such a case he would have opened the first gate and then proceeded to open the second gate. The lorry would have followed him and he would not have been in a position to get injured. The suggestion seems unlikely.

22. It is much more probable that the gates were normally kept open as it is not laid down in the old General and Subsidiary Rules 229 that they must be kept closed and as a matter of convenience the general practice would be to keep them open. They were said to be open when the lorry passed on the outward trip and were open when the accident occurred.

23. The gatekeeper admits that he knows that the gates must be closed and locked when he is absent as laid down in Subsidiary Rule 229 (2). He states that he closed the gates but omitted to lock them. All the General and Subsidiary Rules are very clear that the gates must be closed and locked and makes no provision for gates that are only closed. The conditions in paras. 21 and 22 above could not arise in such a case.

24. On account of the restricted view of the road I do not think the engine driver could have done anything. He was alert and pulled up in a short distance after the accident. The view of the lorry driver was also restricted and I think he was more concerned with getting up the ramp and accepted the open gate as a clear road for himself.

25. **Conclusion.**—The gatekeeper is solely responsible for the accident. He failed to close and lock the gates across the road when he was not present.

26. **General remarks.**—(i) The Railway Administration should take immediate steps to issue revised General Rule 229 with such Subsidiary Rules as they may consider desirable.

(ii) The level crossing should be brought up to standard specification in respect of items 6 and 10 (b).

3. EAST INDIAN RAILWAY.

Running of No. 33 Up Delhi-Dehra Dun Mixed Express into a breach between Chandpur-Siau and Haldaur on the 28th June 1939.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 1235/XIII/39, DATED THE 15TH AUGUST 1939. (1109-T. T.).

Description of the Accident.—In the early morning of the 28th June, train No. 33 Up, known as the Delhi-Dehra Dun Mixed Express, composed of three four-wheeled covered goods wagons leading with eight bogie passenger coaches in rear hauled by CA class locomotive No. 793, ran into a breach in the embankment at mile 26/2 and was badly wrecked. The accident occurred at approximately 2/22 hours, the night was dark and cloudy and no moon was visible, it was not actually raining.

2. Although the bank was evidently washed away it could only have been for a short length and the track was not broken but suspended across a comparatively narrow gap. The weight of the engine as it ran over the unsupported track broke the rails, lurching to the left as it did so, the engine crossed the gap being carried over by its impetus and, having thus derailed to the left, capsized on the slope of the bank just touching the return walls of a 2 × 12′ culvert beyond the breach.

3. The leading vehicles of the train on coming to the broken track suffered severely. The three four-wheeled wagons were thrown down to the right of the embankment. The leading passenger coach ran centrally but, parting from the one in its rear, slewed to the left and was thus crashed into on its right side by the second passenger coach, the third bogie partially telescoped into the rear of the second, only its leading bogie being derailed. The remaining five coaches were undamaged.

4. The crew of the engine escaped almost unhurt and attempted to reach the next station but failed to do so owing to breaches ahead. The guard found a gangman and sent him back to the last station, Chandpur Siau, with a memo. for help. This was received at the station, about 4 miles away, at 3-25 hours. In the meantime the guard and some of the passengers commenced rescue work, and succeeded in extricating those caught in the wrecked coaches.

5. The station master with two doctors and the police arrived by light engine from Chandpur-Siau at 4-45 hours. Altogether 28 passengers were found to be injured and 7 were found dead. The injured passengers were put into the rear five undamaged coaches and taken to hospital at Moradabad arriving there at 11 hours, having received suitable attention 'en route' at Mandi Dhanaura.

One female passenger died in the train on the way and two more died later in hospital. The total number of casualties is therefore 10 dead and 25 injured.

6. The rapidity with which the injured were attended to and removed to hospital is very creditable. Although the Civil Surgeon with four doctors and assistants, compounders, medicines, etc., left Bijnor, the district headquarters, at 6-30 hours they arrived at the accident after all the injured had left.

7. The work of restoring communication was greatly hampered owing to the existence of two more breaches ahead and the consequent inaccessibility of the wreckage from either side. The wrecked vehicles were securely locked together and in some cases had to be cut apart. A relief train from Lhaksar arrived at about 10-30 A.M. and from Moradabad at about

11 hours. They started work immediately on 28th June 1939 but it was not until the morning of the 2nd July that through running was restored and the first train, 2GN, was passed.

8. **Description of the locality of the Accident.**—The accident occurred at mile 26/2. The line is a single track and perfectly straight, there is no grade. At a distance of 150′ before reaching the point of derailment the track is in a cutting from which it emerges over comparatively low land running on a bank average about 4′ in height. The actual point at which the accident occurred is in a short length of bank between two bridges. The first is a small opening 2 spans of 2′, the second, at a distance of 83′ only further along, is 2 spans of 12′. Both are flat reinforced concrete slab tops. The track consists of 75 lbs. I. S. R. rails 30 ft. long spiked on bearing plates to 'Chir' wood sleepers, eleven to the rail length. The ballast is of sand except at the approach to the larger opening where stone ballast has been provided. The soil is very sandy and friable and of a very loose nature.

9. After emerging from the cutting previously referred to, the line runs on a comparatively low bank across a depression for a distance of about 2 miles when it again runs into cutting. This depression is the bed of a spillway, the runoff of a considerable catchment area to the north west of the railway line. In such years as there is appreciable rainfall this depression tends to accumulate water which banks up to various degrees against the railway bank, the flow being from west to east.

10. This branch was constructed and opened to traffic in 1930 and the waterways provided in mile 26 were an opening 2 spans of 2′ at mile 26/1-2 and an opening 2 spans of 3′ at mile 26/18. The whole branch was built as a C class line and a minimum height of bank throughout was provided, the result being that though the formation may not be topped by flood water the bridge openings become submerged. Special precautions are therefore taken and, annually, prior to any actual trouble arising, orders are issued to deal with the diverting and timing of trains, should necessity arise.

11. On the 22nd June 1933, miles 25 to 27 of this branch were badly breached and the then two existing waterways were supplemented in 1934 by two 12′ spans at mile 26/1-2 and four spans at mile 26/17. The bank was also raised a matter of 6″ at the site of the accident, the height being about 4′ as stated. This very great increase in waterway appeared to have the desired effect and though there was considerable rainfall in 1937 no great accumulation of water was experienced nor have trains had to be diverted from the branch.

12. **Evidence and conclusions.**—All the factors and features connected with this accident must be taken into consideration.

As stated, this is a 'C' class branch line constructed at a very low formation level. The traffic on it is very low, three trains each way per day. The last train to run before the accident occurred was 4GN mixed which passed the site of the accident, running in the opposite direction, at about 18-45 hours of the 27th. This train arrives at Gajroula at 20-17 hours and it was the same driver who returned with the ill-fated train No. 33 Up that night. The train was running 25 minutes or so late and there is no indication from the running movements of the train that the driver was trying to make up time or in anyway exceeding the 25 miles per hour, which is the speed limit of the section. The speed at the time of the accident, as stated by the driver, was 20 m.p.h. and there is no reason to disbelieve this.

13. The accident was the result of the train running into a breach in the embankment at mile 26/1-2 at 2-22 hours as nearly as can be determined, this breach was undoubtedly caused by flood water accumulating against the bank. In what manner the breach was effected remains yet to

be considered. The flood water again was evidently the result of rainfall, the intensity of which is indicated by the following record :—

Place.	Fall in inches.	Distance from site of accident.	Direction. from site of accident.
	Inches.	Miles.	
Chandpur Inspection House .	3·6	4	South.
Haldaur Inspection House .	7·0	7	North.
State Tube Well No. 77 . .	5·5	4	West.
State Tube Well No. 72 . .	7·0	3	East.
Magistrate Bijnor . . .	4·45	19	North.
Tube Well No. 28 . .	·10	15	South.

14. These readings taken at 8 hours on the morning of the 28th shew that there was a heavy rainfall in the vicinity of the site of the accident throughout the 27th of June. It is moreover stated that rainfall ceased by the evening as early as 5 P.M. It is certainly admitted that after 8 P.M. there was no rain. Furthermore it will be noticed that 15 miles south there was practically no rain at all that day. It must therefore have been very local.

15. Immediately alongside of the railway line at the site of the accident on the upstream or west side is the village Kulchana. This village was to a considerable extent flooded out by the accumulation of rain water. Water was knee deep in some of the houses, a number of which collapsed. *Photograph No. 1 gives some indication of the state of affairs after the water had fallen.

16. According to one witness, a constable, the trouble in the village was taking place at 10 o'clock at night, when the flood was presumably at or reaching its maximum. Another statement by a local gangman is that the water was half way up the bank, i.e., about 2′ deep at 5 o'clock in the afternoon. It is stated that there was no water standing on either side of the line at midday and the driver of the train who had come through this branch during daylight, from 15-45 hours to 20-17 hours and passed the site of the accident at 6-45 P.M., states that though it was raining all the time it was nothing so heavy as to suggest the possibility of danger and he only saw water lying on the ground and flowing through the bridges, there was no accumulation of water such as was subsequently shewn by the marks on the houses and trees.

17. All the evidence thus tends to show, as has been stated by witnesses, that, although rain fell throughout the day, the heavier fall did not take place until about noon or later and the banking up of water against the railway line did not start until the evening.

There is little doubt as to the height to which the flood rose. This is clearly indicated in the village and on the trunks of trees close to the line. These levels show that the water never topped the bank or flowed over the line, the maximum was 2′-3″ below rail level and at least 10″ below formation level. The level of the 2 × 12′ slab opening is 3′-8″ below rail level so even allowing for the drop in head at the opening from the still water head, the flood at its maximum probably touched the bottom of the slab.

18. Next morning after the accident, all the flood water had completely run off and there was no accumulation held anywhere except in pits. It was then found that in addition to the breach causing the accident there

* Not printed.

were two more breaches, one a small gap of 13′-6″ only absolutely clean cut with parallel sides and with a scour hole down stream, at a distance of only 193′ beyond the 2-12′ opening at which the engine had capsized. The other, or third one of the breaches, was at mile 26/17 and situated between the new opening of 4 × 12′ No. 25B. and smaller 2 × 3′ No. 26. This breach was similar in many respects to the first breach but was tapered being from 66′ wide on the west side to 26′ wide on the east or downstream side. The first breach may have taken any form once it was obstructed by the debris of the train. The first two breaches were close together and drained the same channel but the third breach being half a mile further on and beyond a rise in the ground drained a different channel of the same catchment area which forks down to the two openings. Here also at the third breach there is no sign of the water level having reached the top of the bank.

19. The cause of these breaches is now to be considered. The middle and smallest of the three had all the appearance of a clean cut channel, as if it had been enlarged from an initial notching through the bank. In view of the damage suffered by the village in such close proximity the inevitable conclusion would be that this cut and consequently the first breach into which the train fell had probably been cut by the villagers, in desperation, to save their houses. This does not however account for the third breach, half a mile away and draining a separate channel, unless certain individuals went that distance in the hope of diverting some of the flood down a different channel. This is unlikely. Further against such a theory is the fact that two special constables had arrived that evening and had put up in the village. Had there been any roguery, considering village factions, some rumour of it must surely have leaked out. It is true that some days later a statement was produced but this has been found to be false. In the absence therefore of any evidence whatsoever that the bank was deliberately cut, however likely it may seem, I must look elsewhere for a cause of the breaches, if any reasonable one can be found.

20. The accumulation of water was not very vast in volume, it was less than 4′ deep at its maximum and ran off very quickly. Even when the accident occurred the flow through the breach was very mild. One prominent passenger who did very good work and gave evidence subsequently was by no means impressed. This could not have been the case with anybody who has experienced the terrifying effect of any heavy flood in such circumstances. By next morning everything had subsided.

21. As stated, the water never topped the embankment nor did either of the masonry openings give way or suffer in any manner. It is inconceivable, in fact impossible, that a depth of less than 4′-6″ of water, held up by a consolidated bank of 5 ft. height and of section over 16′ width at the top and over 30′ width at the bottom, could pierce through the bank by sheer pressure and develop a clean cut cannel 13′-6″ wide through it. A breach could be caused by the scour action of flow along the bank or by wave action effected by heavy wind. Neither of these conditions prevailed.

22. Ruling out human agency there must have been some other factors at work. I have said that the first and third breaches were very similar. This is chiefly in the two facts (a) that both were situated in a short length of bank of comparatively recent construction between two openings, an old small culvert and a new larger opening and (b) the breach extends in each case from the back of the small culvert in the direction of the larger opening. The latter has return box abutments as can be seen in photograph* No. 2. The small culvert has neither splay wing nor return walls but each abutment is a wall straight through the bank at right angles to the track. The backing behind the abutment on the breach side in the case of both first and third breaches is cleared absolutely clean out from the masonry as can be clearly seen in photograph* No. 3.

* Not printed.

23. The breach certainly could not have been very great when the train arrived. The rails were intact across it and its position was immediately behind the north abutment of bridge No. 25. This is clearly shewn in photograph* No. 3. The engine and leading wagons were carried across the narrow gap by their momentum as the rails broke. The opening must have subsequently enlarged somewhat by the flow of water.

24. I find that in the construction of these small culverts the backing behind the abutments was filled in with ballast. This is not an unaccepted practice as it allows more freely of drainage. Is it possible that in both cases of bridges Nos. 25 and 26 the same thing could have happened, *viz.*, that the flood water succeeded in percolating through the ballast backing and eventually created a cavity by scouring soil out, thus allowing the upper formation to fall in suddenly? The argument against this is that why did it happen behind one abutment only and not on both sides? Unless it is that the bank between the bridges was of newer earth having been put in since the breaches of 1933.

25. Another feature which seems to indicate a possible solution is from the fact that the ballast in the track just outside the box abutment of bridge No. 25B had subsided slightly, an inch or two only it is true, and the same with some kunker pitching. No such subsidence can occur unless the bank below has also subsided.

The bank has been described as being of loose sandy friable soil. A closer examination revealed in various places a number of holes of small diameter bored into the bank by rats or other small animals. This is not at all uncommon and in flood areas can be a source of danger. Herein lies a possibility of the cause of the breach, in that flood water may have permeated the bank by means of these holes and created voids thus causing a collapse.

26. The only other possible suggestion is that the bank was saturated with flood water and the bottom subsided allowing the upper formation to fall in. This theory is entirely ruled out by the small cut channel of the second breach which could never have been caused in such a manner.

I am therefore forced to the conclusion, in the absence of any other evidence, that the breach was caused by the permeation of flood water through the bank either through the ballast backing behind the bridge abutment or through burrows and holes made by animals.

27. The final consideration is whether the damage that was done could or should have been detected so as to avoid the subsequent disaster.

So far as 'time' is concerned this element does not enter. Had the water topped the bank and breached through in the orthodox manner there would have been ample warning and time for any regular patrol to discern what was happening. If the breach was caused by permeation as suggested there would be no warning. The upper crust or formation would fall in instantaneously as in an earthquake or landslip, either a few inches only or deep according to the extent and position of the cavities created internally, there would be no warning. It is therefore purely a matter of chance as to whether detection is effected. The subsidence may occur just before a train arrives or immediately after the passage of a patrol who has adjudged everything to be safe.

28. I have to consider the actions of the permanent way staff in charge of this section. The length in which the accident occurred is under the direct charge of a Sub-Permanent Way Inspector who is supervised by the Permanent Way Inspector in charge of the branch. The latter inspects the Sub-Permanent Way Inspector's work about once a week. The section is divided up into 4-mile gang lengths each in charge of a mate. The nearest gang-hut to the scene of the accident is at Sisauna in mile 27.

* Not printed.

This is gang No. 7. The accident occurred in the beat of gang No. 6 but, that gang having a 'leave' day, Nos. 7 & 5 were in charge of the beat, the accident site being under gang No. 7.

29. The Sub-Permanent Way Inspector went to Haldaur 7 miles north if the accident site and trollied back to his headquarters at Gajraula by that evening. As it was raining steadily he instructed each gang to go out onto patrol if it rained continuously as it was then doing. This is admitted by the mates of both gangs Nos. 7 & 5 and also by gangmen. He left Haldaur at 9-30 hours and push-trollied the 33 miles checking the, gangs, etc., and arrived at Gajraula at 18-30. He passed out of the rain area at Sherpur where it was quite clear. He states that in the morning it was raining steadily but not heavily. The heavy rain evidently came later, after noon, when he had passed further south. It is certain that there was no indication of any flood or any accumulation of water when he passed through. He was perfectly justified in settling in that night at Gajraula, where it was quite clear, believing everything to be safe.

30. The standard rule for patrolling is that in the event of heavy or continuous rainfall the gangs shall go out on patrol of the bank. The decision rests chiefly, if not entirely, with the gangmate and this must be so as the Permanent Way Inspector or Sub-Permanent Way Inspector may be stationed 20 miles away and experience no rain. The gang mates as a rule realise their responsibility and so do the men generally. On the present occasion the Sub-Permanent Way Inspector having gone through and ordered the patrolling the gangs went out. The amount of patrolling that was done is possibly very much open to debate.

There is no reason to disbelieve the statement that the men went out in pairs during the daytime. Strictly speaking the rain having stopped by evening there would be no object in continuing the patrol throughout the night except for special reason. At 5 o'clock one man says that the water was half way up the bank and was in no way dangerous. The levels, as a matter of fact, indicate that at no time was the water high enough to endanger the bank.

31. The accident having occurred, every man realises that his actions will be called into question and each one is anxious (a) to dissociate himself from the scene of the accident (b) to make out that he did as much patrolling as possible. Both the men whom the mate says he put onto mile 26 say that they did mile $26\frac{1}{2}$ to $27\frac{1}{2}$, *i.e.*, just clear of the accident. They say that they were out all night.

32. The mate of the gang says that he went past the site of the accident twice, once during the day and once at night at about 11 o'clock. Whether he did so or not may be questioned, it can neither be proved nor disproved but there is not the slightest evidence that he did not do so. He states that he had ordered out his gang that night after the evening meal as there was water on both sides of the line. The latter we know to be correct. At 11 o'clock he states that the water was flowing normally through the bridge at the accident site two or three inches below the slab; this last again we know to be correct. The houses in the village were then falling down.

Whether the gangs did all the patrolling stated cannot be truly determined but I am sure that at no time were the conditions of the flood so great in volume and intensity, in current or in height as to cause fear of danger to the bank, the bridges or the line or to suggest any necessity for the diversion of traffic.

33. The whole permanent way staff are naturally very anxious and it is unfortunate that, as stated in para. 19, somebody went to the extreme of attempting to produce evidence to the effect that the bank had been deliberately cut. Whoever did this was extremely ill-advised as it could

only injure his own case which would otherwise be sound. In the circumstances under which it has been shown that the line was breached it would be exceedingly difficult to lay the responsibility onto any individual, such a collapse of the bank being so sudden and unheralded, its detection in good time would be purely a matter of chance.

34. I have previously said that this line was built 'C' class and on a very low embankment. This is the reason for the caution exercised on it each year. In 1933 it was breached at mile 26 and the waterway at the same place was multiplied by more than seven times. Since then there has been no trouble. A circular was issued this year seven days before the acident, letter No. 3/13/33-T of 1939. This was purely a routine letter and in no way indicated any fears of an existing or probable state of danger. I understand that this letter has been issued each year and that on no occasion since the 1933 breaches, nor even this year before or after the present accident, have the measures provided in it had to be adopted. The letter applied to the whole branch in general and is not on account of danger at any particular point in the branch.

35. Leaving out any question of the breach being caused by human agency I can only find that the accident was caused by the train No. 33 Up running at night into a breach caused by flood from rain water percolating into the railway embankment by means of holes formed by small animals, or through the ballast backing of the bridge abutment. I cannot hold any of the railway staff as being responsible or negligent.

4. BENGAL NAGPUR RAILWAY.

Derailment of No. 69 Down Passenger train at mile 488 on the Katni Branch on the 7th September 1939.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 1633/XIII/39, DATED THE 3RD NOVEMBER 1939. (1192-T. T.).

I have to report for the information of the Railway Board details of a serious accident which occurred in the early morning of the 7th September 1939 on the Katni Branch of the Bengal Nagpur Railway when No. 69 Down Passenger train was badly derailed at mile 488. The original information received stated that there was no doubt as to the cause of the accident, this being scour by flood water, and that there was no serious injury to persons. Learning some days later that the cost of damage incurred was heavy and that there was serious obstruction to traffic I arranged to hold a personal enquiry. This I held at Bilaspur on the 17th September 1939, after inspecting the site and repair works. The local civil authorities were advised but they did not consider it necessary to be represented. The enquiry was held in company with the Superintendent, Works, and Senior Officers of the District.

2. **Description of the Accident.**—No. 69 Down is a daily Katni-Bilaspur passenger train. On the 6th September 1939 its composition consisted of five bogie coaches and one four-wheeled coach drawn by G.C.S. type engine No. 213. The 4-wheeled coach was in the rear. A 3rd class bogie was leading, followed by an inter class and then the upper class, a 1st and 2nd composite.

3. The monsoon was in full force and there had been constant rain since the previous day. A bridge at mile 492/17 had shewn signs of distress and consequently special caution was being observed. The train had been piloted dead slow at this mileage and was proceeding at a cautious speed of about 20 miles per hour, when running in mile 488. On reaching a curve, mile 488, between telegraph posts 3 & 4 the engine lurched and derailed on the outer, or right hand side, travelled tangentially for a distance of approximately 300′ and then came to rest, canted over at an angle of about 45°. The two leading coaches slightly telescoped and derailed and the 3rd coach, though not actually derailed, was pushed into the 2nd coach, the inter class. Fortunately no body was seriously injured. Three passengers only and nine railway staff complained of injuries. There was a doctor in the train and early attention was given to them.

4. The time of the accident is given as 4-45 hrs. and this is probably about correct as the train left the previous station only about 3 minutes late.

5. It was seen immediately that the derailment had been caused by the condition of the track. At the place of derailment all ballast had been washed away from under the sleepers. Ahead of the train and over a distance of 500′ were a number of scours with the rails hanging over gaps up to 6′ & 7′ deep and 30′ in length. It is providential that the train derailed where it did and with so little injury to persons. Half a mile ahead between mileages 487/13 and 487/15 the bank, 20′ in height, was completely washed out for a length of 300′ and a great scour created to an average depth of 25′ below ground level. The train must inevitably have run into this pit, full of water, had it not been stopped earlier. The disastrous results may be imagined.

6. The site of the derailment is one mile west of Khongsara station to which a District Traffic Inspector, who was in the train, proceeded and reported the occurrence. A light engine from Bhanwar Tonk arrived on the scene at 7-45 hours and returned with the undamaged coaches and all the passengers to Khodri.

7. Owing to the severe damage to the embankment and the fact that another and almost similar derailment of a goods train had occurred the same night at mile 480/10, about 8 miles away, traffic on the branch was completely dislocated. Through running past mile 480 was restored after 2 days and transhipment was then resorted to at the major breach at mile 487/13 which took several weeks to repair. Owing to the nature of the countryside, standing water in nullahs, the height of the bank and the possibility of a repetition of the trouble the early construction of a suitable diversion was not considered to be feasible. Through running on the branch was eventually restored on the 30th September 1939 at 18 hours.

8. It has eventually been estimated that the cost of damage incurred is about Rs. 5,000 only, which is less than what was first anticipated. This excludes the cost of repairing the major breach at mile 487.

9. **Description of the site of Accident.**—As stated, the derailment occurred at mile 488/3 on the Bilaspur-Katni branch. The alignment is here through heavily wooded hilly countryside. The track is on an embankment for a length of about $1\frac{1}{4}$ miles varied in height from 11′ to 20′ and terminated by a cutting at each end. There is no bridge opening in this length, the gradient is 1 in 1,000 falling in the direction of movement of the derailed train and there is one curve, a left hand of 2° radius, at about the middle of which the derailment occurred where the bank height is about 18′. Soil of the locality and of the bank is of a loose sandy loam. The track consist of 75 lb. rails on steel and wooden sleepers. There is a full supply of stone ballast. A range of low hills on the south side runs parallel to and at a distance of about 600′ from the track connecting up the two cuttings at the end of this length of bank, thus forming an enclosed area. Drainage of this area has always been satisfactorily effected by a cut through the low hills on the east into a river known as the Sagar Nullah which flows from west to east at the back of the range and behind Khongsara station to flow eventually under the track through bridge No. 40, two miles further down at mile 486. On the opposite or north side of the alignment the land is not so hilly, close in, and the river Arpu flows parallel at a distance of about 1,500′.

10. **Evidence and conclusions.**—In regard to the cause of the derailment there can be no possible doubt. This was due to the fact that all ballast had been washed out from under the sleepers in short patches at mile 488/3. How this should have occurred remains to be considered.

11. To the south of the railway line at this mileage is a comparatively small half-moon shaped basin formed by low hills. Its area is only a fraction of a square mile, the catchment area draining into it is about 1·75 sq. miles. The railway bank which forms a chord across the basin is 20′ high where the main breach occurred, *i.e.*, the bed of the depression. Normally this basin is drained through the cut into the Sagar Nullah. It is stated and accepted that the maximum height that water is known to stand against the embankment is about 4′. It has never been imagined that there could ever be an accumulation under any conceivable circumstances to such an extent that water level could rise to the 20′ height required to top the bank. This portion of the line has consequently not been regarded as a danger point in any way and is not a notified 'patrol section'. All other factors affecting the case must be a matter of surmise, as there are no rainfall records available, all that is known is that it was raining heavily in the hills from the previous day and there was probably at least one cloudburst, probably one just over the catchment area to the basin in question just as the Sagar Nullah was flowing at its highest.

12. The Sagar Nullah which carries this drainage passes through bridge No. 40, 4 spans of 40′ girders at mile 486. The highest flood level ever recorded previously at this bridge is 23 ft. below rail level. On the date of the accident this was exceeded by 9′ the river having risen to 14′ below rail level. This is at a bridge, 2 miles below the site of the

accident, and so, allowing for fall and afflux, the high level of the water in the Nullah where the cut at Khongsara meets it must have been above this. Actual levels taken from local marks and indications of the flood shew that the Sagar Nullah had risen to such a height as to discharge in a reverse direction through the cut into the basin at mile 488 at a depth of 12′ above ground level, *i.e.*, 8′ only below rail level at the site of the breach. If the basin filled up first from the Sagar Nullah this extra height of 8′ would have to be made up by excessive rainfall from its own catchment area, before the water level would top the track. This is actually what must have happened.

13. It is not possible to know how much water the Sagar Nullah contributed to the accumulation and how much was from the local catchment area. It is probable that the supply from the two was simultaneous. What is certain is that the water level of Sagar Nullah rose to such a height as to flow back into the enclosed area to the south of mile 488, which it should ordinarily have drained, thus forcing the local rainfall and drainage into that area to bank up to such a height as to top the railway line and to wash out the ballast at the point where the train derailed. Simple calculations on the assumption of various possible rainfall, probable discharge, etc., shew that such an accumulation could be effected in a matter of 4 to 5 hours. That this is what happened is clearly proved by evidence and resultant events.

14. Possibility of detection of the damage and prevention of the accident has to be considered. The last train to pass the site was No. 76 Up Passenger at about 20 hours the previous evening, 8½ hours before the derailment occurred. The nearest ganghut is about 1 mile away. The head gangman has been 18 years on this beat and has never known more than about 4′ of water at the bottom of this 20′ bank. The Permanent Way Inspector has been 10 years on the section and has never experienced any trouble at the site of the accident. There are many lengths on this branch which are known to give trouble or to be stressed in the monsoons and these are all listed and marked in the 'special working orders'. The length in question is not included in these. From general appearances it looks one of the least likely places at which danger might be expected. Owing to the steady rain the gangmen did go out to make a formal inspection of their section. They did so at 15 hours and again passed the spot at about 21 hours. They noticed the usual 3 ft. or 4 ft. of water at the toe of the bank and expected nothing more. Such a rise as would top and breach a 20 ft. bank in a few hours could in no way be anticipated. No charge of negligence can therefore lie with the Permanent Way staff.

15. **Recommendations.**—Such an occurrence having taken place once it may possibly happen again. It is for the administration to consider very carefully the best action to take. It is noteworthy that although the bank was breached at mile 488/3 and the excessive flood water in the Sagar Nullah received relief through that outlet the high flood level at bridge No. 4, mile 486 yet rose 9 ft. above its previous maximum. That bridge may therefore have suffered severely had there been no drainage cut from mile 488 to afford even slight relief. On the other hand it would seem to be desirable to provide an opening in the high bank at mile 488 instead of relying on the drainage cut as heretofore. The question of closing the drainage cut should also be considered but this raises the point mentioned above.

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Railway Accidents

Reports by the Government Inspectors of Railways of Inquiries into certain Accidents

for the

Half-year ending the 31st March 1940

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1. NORTH WESTERN RAILWAY.

Diesel Rail Car No. 92, running as No. 127 Up, running into a motor bus at an unmanned 'C' class level crossing near Moga Tehsil (Ludhiana-Ferozepur Section) on the 28th October 1939.

FROM MR. P. W. WILTON DAVIES, V.D., ASSOC.M.INST.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 4, LAHORE, LETTER No. 82/T., DATED THE 7TH NOVEMBER 1939. (1227-T.T.).

1. **Brief Description of the Accident.**—The accident took place at an unmanned "C" class level crossing at mile 42/4-5 on the Ludhiana-Ferozepur section at 9-33 hours on the 28th October 1939 while Diesel Rail Car No. 92, running as 127 Up, was approaching Moga Tehsil just after passing the 'Up' Outer Signal. As is customary for such cars, the driver had put his engine into neutral about half a mile short of the 'Outer' signal which he then noticed to be at danger. He sounded his hooter, and the signal was lowered when he was about 300 to 400 feet therefrom. He then proceeded on and, as he was passing the 'Outer' signal, noticed a road motor bus approaching, and close to, the level crossing some 60 yards ahead of him and from the right. He then hooted again several times. At the time, the motor bus appeared to be going very slowly till it got on to the line when it seemed to stop with its front wheels and bonnet on the track. The driver then immediately applied his brakes "full on" and in a matter of seconds crashed into the bus dragging it a distance of 166 feet when his leading wheels derailed, because of the front part of the chassis of the bus working in under these. He finally came to a stop some 45 feet further on. The body of the motor bus, containing its unfortunate passengers, was smashed to pieces, and its chassis, engine and wheels badly knocked about—the chassis being all bent and twisted. The dead and injured with their luggage were flung off and scattered about in and alongside the track in the process. The Driver, the Guard and the Traffic Inspector, Mr. Mullenex (who were all thrown from their seats as a result) then alighted and got busy with the injured.

2. As a result of the impact, the front steel plate "cow catcher" of the Diesel Car was bashed in. The right front baffle plate from below floor level was ripped off in the process of dragging the damaged bus, and the wind screen and dash board instrument glasses of the Diesel Car were smashed into small pieces: the coach work in front was dented in a few places. The nature of the damage to the Diesel Car was, however, very slight and the cost is estimated at Rs. 300; its speed at the time was 25 miles per hour: its brakes in good order; its total seating capacity and tare weight 101 and 37 tons respectively; and it was carrying forty passengers besides the Guard, Driver and the Traffic Inspector. Apart from very minor injuries to the last two, because of being thrown from their seats, none of the other passengers in the Diesel Car was injured in any way, and, on alighting and seeing the gruesome results of the accident, they all disappeared towards the town.

3. The registered details of the motor bus were as follows:—

Seating capacity including driver and cleaner . . .	= 25
Luggage capacity	= 46 maunds.
Maximum permissible speed	= 20 m. p. h.
Tare weight	= 5840 lbs.
Owner—Phangan Singh of Maga	
Driver's name—Bhajan Singh of Moga.	

The exact number of passengers, and the actual quantity of luggage being carried at the time was not accurately ascertainable. Report has it that it was carrying passengers well beyond its capacity, and had a good deal

of luggage. Its engine was in a bad condition, it, or its driver, had either an expired licence or none at all (none was found on the dead person of the driver immediately after the accident), and that it had broken down frequently on its journey that morning. In addition, some ghee and other dutiable articles were being carried, and a number of bus passengers were due for the local courts which open at 10 A.M. It was probably in order to avoid the Police and the Municipal Tax Terminals that this unfrequented road was taken by the Bus driver that day.

4. Early that morning the motor bus had apparently commenced its journey from Bilaspur, some 25 miles South East of Moga, and after travelling along the main tarred road from Ludhiana to Ferozepur (where apart from breakdowns, it was reported to have nearly run into another lorry coming in the opposite direction) it took the katcha road leading towards the unmanned level crossing in question. While approaching this, several of its passengers were definite in stating that they saw the Diesel Car at some distance and shouted to the driver to stop while the bus was well clear of the crossing. This, apparently, had no effect, and he continued on to finally stall when the front of his bus got on to the track. Most of the bus passengers struggled to get out, but apart from a few who were said to have been travelling on its roof, and those near the windows, they unfortunately did not succeed and all of them were caught like rats in a trap and were either killed or injured. The uninjured persons made off and had not been discovered upto the time I had completed my enquiry.

5. After dealing with the injured as explained in paragraphs 1 and 6, the Traffic Inspector then endeavoured to get the Diesel Car re-railed by means of a ten-ton handcrane which happened to be in Moga Tehsil station yard at the time but without success. Accordingly arrangements were made to tranship 209 Up and 324 Down at site. At 12-52 hours the Relief Train with a Steam "break down" crane arrived from Ferozepur with the Divisional Superintendent and the line cleared and communication restored at 15-50 hours. Owing to crossings at adjacent stations being thrown out, some delay, not of any material kind, resulted to other trains. Normal conditions, however, were finally restored by about 18 hours that evening.

6. **Medical.**—Arising from the accident, I regret to report that six persons seated in the front portion of the motor bus (including its driver) were killed instantaneously and sixteen injured. Of the latter eleven were seriously injured, of which three died later making a total of 9 dead and 13 injured persons. As mentioned in para. 1, the Traffic Inspector of the section, Mr. Mullenex, after alighting from the Diesel Car set the Guard and Driver to work on the injured with the First Aid outfit from the Car, and then sent for help and medical aid from Moga Town. A private practitioner arrived within ten minutes of the accident happening, then several Sikh gentlemen with lorries, and finally, within half an hour, the Medical Officer Incharge of the local Civil Hospital with some of his staff. The injured were all quickly attended to and conveyed as rapidly as possible to the Civil Hospital. The Civil Police took charge of the dead, the property and luggage lying about, and the damaged motor bus.

7. **Description of the locality of the Accident.**—The level crossing at which the accident took place is a "C" class unmanned one serving a katcha road at mile 42/4-5, 174 feet inside of the 'Up' outer signal of Moga Tehsil. This station is a fairly busy "B" class crossing station on the Ludhiana-Ferozepur section of the Ferozepur Division of the North Western Railway. The railway line on either side is perfectly straight for several miles, and runs due east and west on a bank of an average height of 6 inches to one foot and on a gradient of 1 in 800 for 1,350 feet from the Ludhiana direction and 750 feet towards Moga (falling towards this station), whence it then continues level. The view of both rail approaches from the road is clear—that towards Ludhiana, from which the Diesel Car

was approaching, is clear for as far as the eye can see. The view of the north road approach to this level crossing from the railway from the Ludhiana direction is, however, somewhat obscured by a background of high crops and trees, and is only clear for some 50 to 60 yards near the railway. Some 3,300 feet further on to the west of it is the principal tarred road connection from Moga Town (the bazar area south of the railway) to the main tarred road from Ludhiana to Ferozepur, which parallels the Railway hereabouts at a distance varying from 1/4 to 1/3 of a mile. This pucca road connection is properly equipped with gates where it crosses the Railway. The alignment of the katcha track on which the motor bus was travelling is roughly N. E. to S. W. and takes off the Ludhiana-Ferozepur road about $\frac{1}{2}$ a mile short of where this enters the Moga area and about $\frac{3}{4}$ of a mile short of the pucca road connection just mentioned.

8. The level crossing in question was provided for a katcha road with very occasional cart traffic and a certain amount of animal and pedestrian traffic. It is by no means a busy road, and the classification of the level crossing is, I think, reasonable and adequate for the purpose. Recently the local Municipality is stated to have commenced to metal this road in order to develop the areas alongside, in which some of the Municipal Commissioners are reported to be personally interested. At the time of the accident, short isolated lengths had been metalled, and there were lengthy gaps of unmetalled portions in soft sandy soil in the vicinity of the Railway boundaries on either side. The road surface over the railway track and for a short length on either side was in good condition and upto specification at the time of my inspection after the accident.

9. The weather was clear and fine and the visibility good.

10. **Evidence and Conclusions.**—Through the good offices of the Sub-Divisional Officer (Civil), Moga, only one public passenger who was on Diesel Car No. 92 (Mr. Ved Parkash), could be obtained to make a statement. Others did not turn up. Nothing of any use bearing on the accident emerged from his statement as most of such passengers were unaware of what was forthcoming and after the accident were too upset with what they saw to linger on. Several statements of injured motor bus passengers, who were fit enough, were taken in the hospital by permission of the Medical Officer in charge—of these, three witnesses subsequently refused to sign their statements. None of the uninjured bus passengers could be got hold of, and there were, apparently, no on-lookers at the time when the accident occurred. The other witnesses were the Traffic Inspector, Mr. Mullenex, the Driver, Fateh Chand, and the Guard, Mr. Bakhshi Ram: of these Driver Fateh Chand tended to volubility and found it difficult to stick to the point. The statements taken from the motor bus passengers are quite clear as to several of them having seen the Diesel Car approaching from some distance, of shouting and protesting loudly to the bus driver to stop (without any result), and of the final stalling of the bus on the level crossing and of the subsequent unsuccessful efforts of the majority to get out of the bus.

11. From the local conditions described in paras. 7 and 8, and with full knowledge of the circumstances related in paras. 3 and 4 above—particularly of the unreliability of his engine—there is no doubt to me that the primary responsibility for the accident rests with the motor bus driver, the late Bhajan Singh. He had plenty of warning from his passengers, and he took grave risks in trying to get across the railway in front of the on-coming Diesel Car, when he was well aware of the eccentricities of his engine, of the state of the load on his bus, and of the nature of the track on which he was travelling. The circumstances mentioned in para. 3 above may possibly have influenced him to take the risks he did.

12. In regard to the Driver of the Diesel Car, the "line clear" documents of both Moga Tehsil and Ajitwal stations (the previous block station)

indicated that he was running to time. The time of the accident, *viz.*, 9-33 as compared with his scheduled time of arrival at Moga Tehsil, *viz.*, 9-35, indicated that his speed must have been to schedule throughout. The booked speed for this Diesel Car service is 30 miles per hour, and from the facts stated in the first half of para. 1 above, the estimate of the Driver's speed of 25 miles per hour at the time of the collision is as near correct as possible in the circumstances. In regard to whether the Driver of the Diesel Car was keeping a proper lookout, I am satisfied (i) from the circumstances stated in para. 1 above relating to what occurred while approaching the outer signal, (ii) from the conditions described in para. 7 in regard to the view of the road approach from the North for a railway driver coming from the Ludhiana direction, (iii) for the speed at which he was travelling at the time and the braking power of his car and (iv) from his previous knowledge of the road that he did all that was humanly possible to avoid, if not to mitigate, this unfortunate accident. It must be remembered that the time factor for all these relevant incidents was the time taken to travel less than a quarter of a mile at an average speed of 28 miles per hour. *e.g.*, less than 32 seconds. I therefore, exonerate Driver Fateh Chand from any blame that could possibly be attached to him in connection with this accident.

13. In conclusion I would like to bring to notice the widespread dangers of the kind that arose in this case and that are likely to arise in future from the continued operating of motor buses, lorries, etc., indiscriminately on katcha roads and tracks in rural areas, remote from proper supervision, which cross the railway at unmanned level crossings. This is largely a matter for the local Road Authorities to deal with, but is one which, if allowed to develop, may, I feel, involve the safety of the travelling public on the Railway to a greater extent than hitherto.

2. EASTERN BENGAL RAILWAY.

No. F. Down Goods train running into a lorry at level crossing No. 5-I.E., near Bharatkhali Station on the Tistamukh Ghat-Bonarpara (M. G.) Section on the 5th January 1940.

FROM MR. K. B. LAL, M.I.E. (IND.), SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE NO. 2, CALCUTTA, LETTER NO. 259/1010 (92), DATED THE 7TH FEBRUARY 1940. (1260-T.T.)

1. **Description of the Accident.**—At about 16-55 hours on the 5th January 1940, No. F. Dn. Goods train ran into a lorry occupied by 17 persons and the driver of the lorry at Level Crossing No. 5 I. E. at mile 229/11-12 on the Tistamukh Ghat-Bonarpara, Metre Gauge Section of the Eastern Bengal Railway. As a result of the accident, out of the people riding the lorry 3 persons were killed outright, two were seriously injured and 12 others including the lorry driver received minor injuries. The lorry which was caught by the engine in the middle was completely smashed up, its parts were scattered either side of the engine and some went under it. There was no injury to any of the railway staff. For list of the dead and injured, please see *Appendix 'A'. In this list, mention is made of an Assistant Motor Driver Khapa. This man, however, is not mentioned by any of the witnesses. I conclude that there were only 17 passengers and the lorry driver on the lorry before the accident.

2. The train consisted of 21 loaded and 23 empty wagons (in terms of four-wheeler) with a brake van at either end, drawn by an R. S. Class (4-6-0) engine. The weight of the entire train was 415 tons and its over-all length 1,140 ft. Only the engine was fitted with vacuum brakes, the effective braking weight being 40 tons including that of the tender.

3. The engine of F. Dn. Goods caught the lorry in the middle and carried it forward 432 ft. before stopping. The passengers on the lorry were thrown clear of the track either side, except one woman who got entangled under the engine and died soon after.

There was only slight damage to the cowcatcher of the engine but none to the permanent way.

4. The speed of the train was said to be ten miles per hour by several witnesses, but the driver of the engine stated that it was 15 miles per hour.

Weather was clear at the time and visibility good, the sun not having set when the accident occurred.

5. **Description of the locality of accident.**—Level Crossing No. 5 I. E. is situated at mile 229/11-12 being that distance away from Calcutta on the Metre Gauge Branch Line from Bonarpara to Tistamukh Ghat. It is located between the Down Outer and Home Signals at Bharatkhali. The level crossing is 'C' Class although the classification is not marked on the Gate Lodge. The letter 'I' refers to the section of the line and 'E' signifies, that it is under the Engineering Department. The level crossing serves an unmetalled road going from Bharatkhali Bazar to Gaibandha which are about 9 miles apart. No road signs are provided as the road is a kucha road. Only chains with red discs are fixed across gate posts without any lights at night.

One gateman, for whom a hut is provided, is supposed to perform duty from sunrise to sunset after which he leaves the chains open for the night.

6. The railway line at this spot runs due east and west, being straight for several miles and the road crosses it at an angle of 76° running north and south. The train was going from east to west and the lorry from south to north. Starting from Tistamukh Ghat the line is level, running past mile 231, after which it rises in a grade of 1 in 200 coming on to Ghaghat Bridge and then falls in a grade of 1 in 244 for a length of 1,600 ft. until

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* Not printed.

within 200 ft. of level crossing No. 5 1. E., after which it is level right into Bharatkhali Yard. A sketch of the site of accident is enclosed as *Appendix 'B'.

7. An engine driver can clearly see the Level Crossing and objects on it from a distance of 2,100 ft. coming from the east. As a result of personal tests on the same engine that brought about the accident, it was found that from the driver's position on the right of the engine his view for objects approaching the level crossing, from the left remains clear while he is still 320 ft. from it but gets obstructed subsequently, due to his position on the right of the engine and the whole engine being in front of him. Similarly objects in the centre of the Level Crossing cannot be seen after the Engine is 155 ft. away from the same. There was only one fireman on the engine, who was busy drawing coal from the tender prior to the accident.

8. Any body coming on the road from south to north can see a train approaching from the east while he is still 62 ft. away from the Level Crossing, *i.e.*, as soon he gets clear of houses on his right (each) side. This view gets obstructed again for the width of the gate lodge which is only 12'. There is a grade of 1 in 32 approaching the level crossing from the south and this is rather abrupt close to the railway bank. On the other side of the railway line the road runs down in a grade of 1 in 27.

9. **Report and Evidence.**—The Level Crossing being a 'C' Class one, one man remains on duty from sunrise to sunset. During the night the chains are supposed to be left open for road traffic although the gateman is required to sleep at the gate. At the time of the accident the sun had not gone down but the chains either side had been left open. No body saw the gateman at the gate when the accident occurred. Since then he has absconded and could not be traced till the time of the enquiry. He left the gate lodge locked up with his belongings, and the equipment provided by the Railway. The gateman whose name is Raich is a semi-literate class of man having read upto the 7th standard and is said to be 22 years old. He had put in 15 months' service of which the last 8 months were at the gate in question. The Permanent Way Inspector in his evidence said that he found Raich attentive to his duties. He is a resident of the locality and was transferred there at his own request from another level crossing on the main line.

10. The lorry was engaged by 3 families to go from Bharatkhali to Gaibandha to witness a cinema show at the latter place. The carrying capacity of the lorry No. MB. 15188 was ten, but there were actually 12 adults and 5 children (excluding the driver) in it when the accident occurred. The lorry driver whose name is Sumanta Kumar Dey was in the lock up at the time of my enquiry, and although the Divisional Superintendent, Eastern Bengal Railway, asked for this man to be produced at the enquiry, he was not brought forward by the Police Department.

Sumanta Kumar is a young man of 22 years and his driving license was for driving a light car only. His evidence as recorded by L. P. Banerjee, Station Master, Bonarpara, is with the rest of the evidence.

Copies of evidence recorded are enclosed as *Appendix 'C'.

11. F. Dn. Goods covered a distance of 7 miles from Tistamukh Ghat before meeting with the accident, in a period of 45 minutes. For the first 5 miles the speed is limited to 10 miles per hour and for the remaining 2 miles the maximum permissible speed is 25 miles per hour. Allowing 10 minutes for the train to pick up a speed of 10 miles per hour in which period she would have covered a distance of nearly one mile, it leaves 35 minutes for the train to have travelled 6 miles. The average speed works out to about 10 miles per hour. The driver would not take advantage of the higher speed limit of 25 as he had to stop at Bharatkhali station, which is hardly a mile away from the level crossing. I conclude that the speed

* Not printed.

of the train was not over 12 miles per hour at the time of the accident and the driver over-estimated the speed when he put it down at 15.

12. Several of the witnesses (2 passengers on the lorry and 1 on the road) not connected with the Railway, have deposed that the lorry was being driven 'very fast' or 'at a very high speed'. It is difficult to say what this speed might be, but ordinarily buses do not run faster than 20 miles per hour and by the words 'very fast' I presume she was doing about 30 miles. With the heavy load and running on a kuchha road, the bus would not be capable of running faster. It has not been possible to gauge the speed from the time and distances covered, as the witnesses were very vague about it. The passengers on the bus were going to witness a cinema show about 10 miles away and were in a hurry to reach the spot. They have deposed that the bus made so much noise that it drowned all other noises including that of the approaching train.

13. The engine and the lorry arrived at the level crossing simultaneously for the accident to have occurred as it did. The engine was travelling at a speed of 19 ft. per second and the lorry at 44 ft. per second as mentioned in paras. 11 and 12 above. While the lorry was 62 ft. from the level crossing the engine was 24 ft. away only. From this position, the lorry driver could clearly see the engine approaching the level crossing on his right (or east), whereas the engine driver could see nothing approaching the level crossing from his left (or south) as mentioned under para. 7, until the object was on the crossing itself.

14. **Conclusions.**—The primary responsibility for the accident rests with Gateman Raich in that he left the claims at the gate open and was not present at the Level Crossing. He acted in contravention to General* Rule 229 (h). The fact that he absconded after the accident is an admission of his guilt.

15. Sumanta Kumar, driver of the lorry, is responsible for:—

(a) Driving a lorry when he was in possession of a licence to drive a light car only.

(b) Over-loading the lorry.

(c) Running at excessive speed.

(d) Not exercising due caution when approaching a level crossing.

As I have pointed out under para. 8, he could clearly see the approaching train while he was still 62 ft. away from the level crossing and this distance was ample for him to stop the lorry.

16. I exonerate Driver Jaglall of F. Dn. Goods. He could not see the lorry from the time it emerged clear of the houses alongside the road until it was on the level crossing itself. The train being non-vacuumed and coming down a grade 1 in 200 could not be stopped in a shorter distance than 432 ft.

17. There was no delay in attending to the injured persons as several local doctors arrived at the site soon after the accident. The Railway Doctor came as promptly as he could and rendered all possible assistance.

18. **Recommendations.**—The accident occurred at about 16/55 hours. Had it occurred half an hour later when the sun had gone down, the gateman would not have been responsible for the accident. According to the existing rules of the railway he would have been within his rights leaving the chains open and going off duty.

19. Presumably these rule are based on certain correspondence† that took place between the Senior Government Inspector of Railways, Circle No. 4, Lahore, the Agent, N. W. Railway and the Railway Board. Attention is invited to correspondence referred to in ‡Appendix 'G'. I, however, do not agree with the views expressed therein.

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* *Note by the Railway Board.*—The reference is to the E. B. Ry. Subsidiary Rule 229(*h*), not to the General Rule.

†*Note by the Railway Board.*—The correspondence referred to was superseded in 1938 by a revision of General Rule 229.

‡ Not printed.

20. Apparently the practice of treating level crossings with only one man on duty from sunrise to sunset, as unmanned during the night, resulted in heavy incidence of accidents on the E. B. Railway and as a result of discussion between my predecessor and the Heads of Departments of the E. B. Railway revised decision was come to. This is annexed as *Appendix 'D'. The result of the proposed reclassification is not known to me so far.

21. In my opinion more protection is needed at a level crossing during the night than during the day. It is a well-known fact that cartmen go to sleep at night letting the bullocks move on to the destination. There is greater risk of such carts being run over if the barriers at level crossings are left open.

22. My views are supported by the present practice on four Class I Railways, *i.e.*, the E. I., B. & N. W., B. N. and A. B. Railways to whom reference was made in this connection. Copy of my query together with their replies is attached as *Appendix 'E'.

23. I, therefore, recommend that all 'C' class level crossings where only one man is posted should have their gates or chains securely fastened across the road at night. Ordinarily no lights can be fitted at single manned level crossings particularly where only chains are provided. Red discs should be clearly visible in the head lights of any fast moving vehicle. There may, however, be a few cases where a red light, on a high post not easily accessible to a pedestrian may be provided in cases where gates exist.

24. A census of traffic at the level crossing in question is attached as *Appendix 'F' and in my opinion it does not justify the appointment of a second gateman.

25. Gate-keeper Raich is a semi-literate class of young man aged 22 years. This man will not have much interest in his duties as a gateman and was in addition posted near his own village, where possibly he had other attractions. In my opinion elderly men with families, well away from their homes, should be kept as gate-keepers. They should be given a little piece of land for cultivation and all their life's interest should be at the gate itself.

26. The Civil Police should exercise greater vigilance to see that unauthorised persons are not allowed to drive fast moving vehicles and that they are not overloaded.

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* Not printed.

Supplementary Note by Mr. K. B. Lal, M.I.E. (Ind.), Senior Government Inspector of Railways, Circle No. 2, Calcutta.

I beg to inform the Board that although I did not specifically refer to General Rule 229 (3), I had the same in mind when making my report. As I pointed out, the Railway Administration had issued special instructions for not locking up the gates (or chains) at night in the case in point.

The Railway Administration has subsequently agreed to keep such gates or chains locked at night, *vide* para. 1 (b) of the General Manager, Eastern Bengal Railway, Calcutta's letter No. I. T./74/1/T. A. G., dated 2nd April, 1940, to the Railway Board.

Under the circumstances, the case does not call for any further action.

3. BENGAL NAGPUR RAILWAY.

No. 531 Down Goods train crashing into the Down Catch siding at Khodri on the 8th February 1940.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 483/XIII/40, DATED THE 20TH MARCH 1940. (1310-T.T.).

1. **Description of the Accident.**—No. 531 Down (Transhipment) Goods train, a comparatively light train fully vacuumed consisting of engine No. 659 and 27 vehicles, left Pendra Road station at 3-48 hours on the morning of 8th February 1940, running about 1½ hours late, on line clear to Khodri where crossing with No. 534 Up Goods had been arranged. That train had left Bhanwar Tonk in the up direction at 3-01 hours.

2. The intention of the Assistant Station Master, Khodri, was to admit the Up train first, consequently the points were not set for No. 531 Down, nor was the signal lowered. No. 531 Down arrived outside Khodri at 4-5 hours, ran past the signal at danger and at speed entered the catch siding protecting the facing points. It crashed into and over the buffer stop and ran 60′ on into a cinder heap some 8′ in height in which the engine embedded itself, stopping abruptly. The rear end of the tender canted up and forwards into a vertical position. The front end of the leading wagon mounted up on to the end of the tender.

3. The entire engine crew, a driver and two firemen, were killed instantaneously.

Damage to the wagons and permanent way was not great but to the engine it amounted to about Rs. 15,000.

Relief trains were requisitioned from Bilaspur and Sahdol. There was no obstruction to the main running lines.

4. **Description of the locality.**—The accident occurred in the down catch siding protecting the north end of Khodri station on the Katni branch of the Bengal Nagpur Railway. The preceding station in this direction is Pendra Road at a distance of seven miles. The whole of this length is one continuous down grade from Pendra Road with a total fall of 200′. The ruling grade is 1 in 100. The grade past the down signal to Khodri is 1 in 100 easing to 1 in 250 past the catch siding where the accident occurred. Khodri station is graded 1 in 1,000 between facing points.

5. The last four miles of the alignment falling into Khodri are a constant series of curves in cuttings and embankments, heavy forest flanking the whole distance. The final curve into Khodri on which the signal is situated is of nearly 6° and almost a full right angle, there is a straight of 600′ outside the points.

6. **Evidence and Conclusions.**—The accident was originally reported as being a simple case of disregarding of signals by the driver. On investigation I find that there are several very serious features and the matter is far more complicated than this.

This portion of Katni branch was constructed and opened in 1891 and as a new line traffic was very light. For the purpose of this report the section Bhanwar Tonk-Khodri-Pendra Road only is considered.

7. The whole of this length is a continuous down grade, there being a further fall of 332′ into Bhanwar Tonk from Khodri a distance of 7 miles, the ruling grade is 1 in 84. All three stations are classed as 'B', 'non-interlocked'. The signalling is the same for all. Starters in each direction and single outers at each end exist at a distance from the facing points. At Khodri north end, *i.e.*, the down direction, this distance is 1,494′. At a distance of 126′ outside these facing points is the catch siding fitted with spring switches. A similar catch siding exists at Bhanwar Tonk.

8. The decision to provide these catch sidings was made in 1931 and was occasioned by the occurrence of a very bad accident elsewhere and a consequent demand for such sidings on all heavily graded track. The original signalling for the branch was outer signals and main platform signals only. This was presumably on account of the light traffic. In the year 1916 the main signals were, for some reason, removed. With the provision of these catch sidings with spring points starters were provided at these three stations. Hence the present peculiar equipment.

9. As stated, these three stations are 'B' class and worked on the absolute block system. The Assistant Station Master states that he gave line clear to No. 534 Up to approach from Bhanwar Tonk and received out report at 3-01 hours. He then gave line clear for No. 531 Down to approach from Pendra Road so as to cross them at his station, it was his intention to admit No. 534 Up first and consequently the points were set and the Up signal lowered for that train. By 3-50 hours the train had not arrived. On looking for it the Assistant Station Master states that he saw it within the Up signal, stopped on account of the grade. At this time, about 4 o'clock, he saw the head lights of No. 531 Down come round the curve, the train had passed the Down signal at high speed. The points were not set for it and it ran into the catch siding where it crashed.

10. The true reason for the driver passing the signal at danger will never be known. All the crew were killed. The guard of the train alone is available and his evidence is both contradictory and unreliable.

11. According to the guard the driver was controlling his train before reaching the signal which he (the guard) saw was at danger (a) when he got up to it (b) from 600′ away when he saw the engine pass it. The train passed the signal at 28 miles per hour yet the full vacuum, which had been 16″, was destroyed. The light train had then run 1,500′ further and crashed into the buffer stop at 20 miles per hour. On finding that his statements were not consistent with each other the guard became confused and then took the ground that it was his duty to watch the signal all the time and this is what he had been doing.

12. It is worthy of note here that, since a recent decision resulted in a very severe sentence being passed on a guard, it is probable that in future accidents little assistance will be available from them at enquiries, they will always have been 'watching signals' similarly to the evidence of a second fireman which is invariably 'I know nothing, I was breaking coal'.

13. The train had left Pendra Road at 3-48 hours. The crash occurred at 4-05 hours, *i.e.*, 17″ later after running 7 miles. The permissible speed is 35 miles per hour. There is therefore no reason to believe that the speed limit was exceeded. On the engine the vacuum brake handle was found full 'on' and the reversing gear back to just over one notch past centre into reverse. It seems therefore that the driver was aware that he was running into a station. Whether he knew that he had passed a signal cannot be ascertained but it is incredible that vacuum could have been destroyed a great distance back as asserted by the guard. The engine had run over 1,800′ past the signals, crashed the buffer stop, run a further 60′ and bedded into the cinder heap. It would almost seem that the driver had lost entire control of his train on the steep grades. The evidence of the guard is useless in this matter.

14. There is no doubt that the signal was at danger. It could not have been lowered while No. 534 Up was being admitted. It could only be lowered after the catch siding spring switches had been set, the back light was visible from the station.

Situated on a series of curves this signal is a very difficult one and is described as being tricky. It is fully focussed on a point 2716′ distant, the driver of an approaching train gets his first glimps as he comes through the forest at 2866′ from the signal and then only if he is quick in catching

it. He gets a diminishing view for five telegraph posts and then loses it, the light then becomes visible to his fireman on the left of the engine. At 289′ from the signal when the track curves left the driver again sees it.

That this is a tricky signal is evidenced by the fact that on 19th January 1940, only 20 days previous an exactly similar accident with the same train at the same station had occurred with an experienced driver, but with this difference, the driver in that case had been able to pull up his train to a dead stop just after entering the catch siding and had not crashed into the buffer stop at the end.

15. Another feature of this accident is that the driver was young and very inexperienced. He had only recently been promoted and this was actually his first independent run as a driver. He had never been in charge before. He was not well acquainted with this branch and had been out on three occasions only 'learning the road'.

16. So far then as the driver of the engine is concerned I can only conclude that he was travelling at a full 30 miles per hour on the down grade of a tortuous section with which his acquaintance was very slight. He had little knowledge of the road and missed a tricky signal as he turned the critical bend. If he saw the signal at all it was probably when he was just below it. As a last resort when he saw the station lights he made an effort to stop his train but being on a down grade of 1 in 100 and in the early morning when the rails were probably very wet and slippery he was unable to do so.

17. When opening my enquiry I had anticipated nothing more than the above as a final result but an entirely different aspect becomes revealed.

As previously stated both Khodri and Bhanwar Tonk are 'B' class stations with absolutely identical conditions. Both are at the bottom of a seven mile tortuous gradient both are equipped with an outer and starter signal at each end and both have a catch siding in the down direction. Special working rules are provided for both of these stations but for some unkown reason these are not the same. For Khodri a special precaution is laid down for the reception of all trains from Pendra Road. Rule 15 (a) under B.S.P., S.W.O., L.X, requires that (a) From Pendra Road :— 'Permission to approach' must not be given to Pendra Road for a down train unless the line on which it is intended to receive the train is clear, and the points correctly set and locked for the admission of the train on the said line, and the points of the catch siding set and locked for the main line.

18. This rule is tantamount to introducing 'A' class working for Khodri in the down direction. It is strange that there is no similar rule at Bhänwar Tonk station especially as the down approach to that station is even steeper than the approach to Khodri from Pendra Road. Be that as it may there can be no doubt that this rule was ignored by the Assistant Station Master on duty and this is readily admitted by him. Had it been observed there would have been no accident as occurred and the driver would have had the additional full length of the station line to stop in.

19. There is no objection to crossing trains at Khodri station. There is no objection to permitting the approach of trains from both directions at the same time but only on condition that the down train is received first, all points being set for that train before the line clear is given.

20. No. 531 Down Goods was irregularly admitted into the section on 8th February 1940 and I hold the Assistant Station Master, Khodri, responsible for the accident which resulted in that he broke the station working rules BSP. LX. 15 (a) and gave 'line clear' without either having set the points or being prepared to receive the train. A contributory cause of the accident lies in the fact that the driver, who was entitled to expect everything ready to receive him, ran past the signal at danger presumably either having missed the signal or having lost control of his train.

21. **Remarks.**—Several features are prominent :—

(i) It is strange that a similar accident but without serious results should have occurred only 20 days previously without it becoming apparent to all that the working rule was being ignored by the station staff. On enquiry I learn that at the outset the Locomotive Department had accepted responsibility for the accident on account of the driver having passed the signal at danger. This was accepted and every body was 'side-tracked', there being no further investigation. This ignorance of rules is a strange state of affairs and requires further attention. It is difficult to understand why responsibility was accepted.

(ii) The Assistant Station Master was a new man, this was his first station and he had been in the post for one day only, yet he commences his career by breaking the rules in which he had been examined and passed only 24 hours previously. He knew that rule 15 (a) was not being observed at the station and accepted the fact without saying anything. The Station Master who had been for 6 months at this station also states that this rule has been disregarded for a long time. That if he observed it trains would be delayed and he would be called to account.

(iii) I have examined the time tables to see whether there is anything in the timing of trains which would be inconsistent with working rule 15 (a) and thus lead the staff to act irregularly. I find nothing in the current train timings but I do find such an instance in the time table of three years ago, which came into force on the 1st April 1937. Two passenger trains Nos. 68 Up and 67 Down were then booked to cross at Khodri. No. 68 Up was booked to leave Bhanwar Tonk at 10-27 hours arriving Khodri 10-58 hours, No. 67 Down was booked to leave Pendra Road at 10-48 hours arriving at Khodri 11-5 hours. The down train was to be given line clear from Pendra Road while the Up train was on the section from Bhanwar Tonk. The latter train was to be received into Khodri first. It was impossible for the signal to be lowered for the up train if working rule 15 (a) was to be observed and the line and points set for the reception of the down train.

It would seem that the discrepancy was not noticed and that the station staff adopted the simple expedient of breaking the rule and saying nothing in order to work to the time table. This would account for the existence of this irregular working at Khodri.

(iv) The signalling system in this branch is very elementary and, considering the present speeds and traffic, it is inadequate. As stated in paragraph 8 main homes existed until 1916 and were then removed leaving outers only. In 1931 starters were introduced with the catch point spring switches, which were key locked with the signals. I find in my records that the sanction for these was given provisionally by the then Senior Government Inspector pending the final decision of the Railway Board as to the design of such sidings.

These sidings as designed, were then described by the Senior Government Inspector as being not true catch sidings but really "Wrecking sidings". This has proved to be only too true. Apparently the matter rested there as I can trace nothing further.

(v) In 1932 the speed of the section was raised and sanctioned at 40 miles per hour. At or about the same time the Traffic Manager desired the provision of home signals, having received the increase of speed he could only require them on the grounds of safety, and the estimate was not sanctioned. Again in 1935 it was evidently realised that some expansion in the signalling was necessary. The estimate was included in the budget but did not pass through. The increase of speed should have been made dependent on improved signalling.

(vi) There is much discussion over the relative merits of 'A' class and 'B' class working. There can be no contention that both are equally safe,

whatever may be the circumstances in which the latter is desirable. Had 'A' class working been followed according to rules this accident would not have occurred.

In 1936 it was ruled that speed of a section has no relation to the system of signalling of the section. This is a view to which I am strongly opposed. The present accident clearly illustrates how speed, signalling, system of working and general topography are inextricably associated. It will be objected that this is an extreme case, possibly so, but there are intermediates and a policy of 'safe enough' must not be adopted in lieu of the principle 'Safety first'.

22. **Recommendation.**—(i) Speed on the ghat sections of the Katni branch must be reduced to 25 miles per hour until such time as adequate signalling is provided. From Khongsara to Pendra Road it must consist of token instruments and complete lock and block.

(ii) Token instrument working should be installed throughout the whole branch.

(iii) A catch siding must always be designed as a sand hump.

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Railway Accidents

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which occurred during the

Half-year ending the 30th September 1940.

No. 28.

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Lt.-Col. R. E. Gordon's report of an enquiry held to investigate the circumstances attending the accident to No. 7 Dhanushkodi Passenger train at mile 75/12-14 between Panchalam and Tindivanam on the 28th May 1940.

4. Eastern Bengal Railway—

Mr. K. B. Lal's report of an enquiry held to investigate the circumstances attending the derailment of No. 8 Down Dacca Mail between Chuadanga and Jayrampur on the 5th August 1940.

BOMBAY, BARODA AND CENTRAL INDIA RAILWAY.

Derailment of No. 148 Up Mixed after parting at mile 0/15-16 on the Broach-Jambusar-Kavi Narrow Gauge Branch on the 3rd April 1940.

FROM MR. J. C. O'NEILL, SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 5, BOMBAY, LETTER No. 509, DATED 11TH APRIL 1940. (1327-T. T.).

1. **Description of Accident.**—On 3rd April 1940, No. 148 Up Mixed left Vejalpore at 19-14 hours with a load of 37 units consisting of 12 bogie wagons, 4 four-wheeled wagons, 4 bogie coaches and 1 LG Brake Van. At mile 0/15-16 (approximately 4,200 ft. from Broach Station) the train parted between the 2nd and 3rd bogies Nos. 3121 and 3104, due to the drawbar breaking. The front portion of the parted train consisted of Engine ZB No. 20 with loaded bogie No. 3269 weight 22 tons and empty bogie water tank weight 8 tons. The rear portion was the balance of the load, *viz.*, 33 units weighing approximately 269 tons.

2. The driver noticed the parting gave the code train parting whistles to the guard and kept the front portion moving ahead of the train till he reached Broach, where he came to a stand at the usual stopping point on the platform line. The guard noted the parting at a later stage than the driver and applied the brakes of his Brake Van. He was not however able to control the second portion of the train which continued to run forward and collided with the front portion at a high speed and with considerable force.

The driver of the train had applied his brakes after coming to a stand and the impact from the second portion of the train pushed the engines and vehicles of the front portion forward some distance thus acting as a cushion. The force of the collision being thus reduced caused the 2nd, 4th and 5th wagons from the engine to derail and the 6th wagon from the engine to derail and tilt over.

3. The passengers in the rear of the train were shaken and three were treated for minor injuries. Medical assistance was on the spot within 5 minutes of the accident. The injured passengers were taken to the local Railway dispensary and treated within 20 minutes. They recorded statements to the Station Master, Broach, and were permitted to proceed to their homes at their own request. Translations of the recorded statements which were in vernacular are attached (as Appendix E)*.

All assistance for restoring communication was available locally. The wagons were rerailed by 1-30 hours and the line cleared at 14-30 on 4th April 1940.

4. **Description of Locality of Accident.**—Broach Station is on the Bombay-Baroda Section of the B., B. and C. I. Railway and about 200 miles from Bombay. It is also the terminus of the Broach-Jambusar-Kavi 2′—6″ gauge branch line worked by the same Administration and the accident took place on the branch line.

The site of the collision between the first and second portions of No. 148 Up Mixed is on the branch platform line which is just behind and at the north end of the Down Main Line platform. The branch line terminates in a dead end just ahead of the platform.

5. The parting of the train took place between mile 0/15 and 0/16. This point is fixed from the finding of the inner end of the drawbar which was picked up at this point.

From the point of parting the grade is 1 in 500 up for 100 to 150 feet. Following this there is a down grade of 1 in 500 for 1,000 feet and a further down grade of 1 in 1,000 for 1,500 feet after which the line is level for a distance of 1,584 feet into the station.

* Not printed.

6. **Evidence.**—The evidence of the train crew shows that the parting was noticed by the driver immediately it took place and that the throttle valve of the engine was open at the time. From the position of the train this would appear correct and there would not be any jerks or jolts to account for the parting.

The drawbar does not show any wear or reduced section at the point of fracture. The section of the fracture does not show perfect metal throughout but such small flaws as were there would not seem to account for the breakage.

7. The guard and travelling porter were in the Brake Van and working on sorting letters, etc. They did not hear the train parting signal given by the engine driver but the parting was noticed owing to train gathering speed.

The hand brake in the Van was applied, released and applied again and left on. If the guard's evidence can be accepted the hand brake must have been applied very shortly after the parting as the guard, looking out after releasing the brake, noted passing telegraph post 0/10. The application of the hand brake did not check the speed of the train.

8. The Brake Van is a light four-wheeler of 2 tons 15-cwt. tare. There were not many packages in it and the total weight would not be much over 3 tons. The brake blocks are of wood and in a test it took nine turns to get the brake hard on. This left very little further travel on the worm driving the brake but there was ample room to get the brake hard on.

There is another type of brake van in use on this branch. This is a bogie third class coach of 8 tons 8 cwt. tare with a hand brake fitted at one end. There was one of these at the front end of the passenger coaches but unfortunately it was not manned.

9. There is no doubt that the Van brakes were unable to check the speed of the train and that the second portion was following close on the first. The speed of the second portion was probably in the neighbourhood of 25 miles an hour.

Conclusion.

10. The accident was due to the drawbar breaking. There are slight flaws in section but not in my opinion sufficient to warrant the breakage. The metal should be tested and, if not defective, the strength of the section should be looked into.

11. The speed of the train was normal. It may be said that the driver of the train should have checked his speed and brought the train under control. Such action would have required superb judgment and a considerable slice of good fortune if it was to be carried out without derailing the leading vehicles and causing the rear portion of the train to pile up.

12. The driver would normally expect the rear portion of the train to be checked by the guard and his action in waiting for this was correct. When he saw that a collision with considerable force was inevitable he went ahead and brought his engine to a stand some distance from the dead end. It would be difficult to say when he arrived at the conclusion that the collision was inevitable but his action in giving the guards brakes the maximum time to reduce speed was probably the best he could have done.

13. The Guard did not hear the train parting whistle. His attention was drawn to this by the accelerated speed of the train. Yet he found time to apply the brake and immediately release it and look out before arriving at mile 0/10. This application of the brake would not have any material effect on the speed as it was not in action a sufficient time. It can thus be taken that the brake was applied after mile 0/10. The point is not of much consequence as I do not think the brake power available was adequate to have much effect even if applied slightly earlier.

Recommendations.

14. Additional third class bogies should be converted into type BTG and their tare should be increased to 10 tons. One of these should be attached at each end of the passenger coaching stock of mixed trains and both brakes manned.

15. The instructions to guards regarding the application of brakes should be revised. To the unmechanical mind the literal interpretation of applying and releasing the brake would result in the brake being released immediately after it is applied and the effect will be practically negative. The application of the brake by hand power is scarcely sufficient to cause skidding and it would be preferable for it to be applied and kept on.

BENGAL NAGPUR RAILWAY.

An up Light Engine running into a motor bus between Benapur and Narayangarh on 15th September 1940.

FROM MR. H. A. JOSCELYNE, M.I.C.E., SENIOR GOVERNMENT INSPECTOR OF RAILWAYS, CIRCLE No. 1, CALCUTTA, LETTER No. 1600/XIII/40, DATED THE 29TH OCTOBER 1940. (1400-T. T.).

1. **Description of accident.**—At about 14-15 hrs. on the 15th September 1940 up light engine No. 417 GS was proceeding to Khurda Road to work back the Down Governor's Special of that date. When passing level crossing No. 81/21-22-A, at mile 81/21-22, between Benapur and Narayangarh the engine collided with a Motor Bus No. 231 MD which had just entered onto the crossing from the west or left hand side. The bus was hit on the right in the region of the driver's seat and knocked sideways becoming jammed against the left hand gatepost. The vehicle was completely smashed, its fore-end being pulverised. The engine which is said to have been travelling at about 25 miles per hour ran on about 1000' further before stopping, the driver then backed to the scene to ascertain what had happened.

2. There were said to be about 17 passengers in the bus in addition to the driver and conductor. As a result of the collision 5 persons in the bus including the driver were killed on the spot, 8 persons were seriously injured out of which 1 died in hospital at Kharagpur. Four others were slightly injured.

3. Information concerning the accident was received in the Control Office at 14-35 hrs. and arrangements were immediately made to run out a relief train. The relief train with Doctors and Ambulance Carriage left Kharagpur at 15-38 hrs. and arrived back at 17-11 hrs. with the injured persons who were removed by motor ambulance immediately to Kharagpur Railway Hospital.

The five dead bodies at the site of the accident were taken over by the Government Railway Police, Kharagpur, and disposed of after the necessary medical certification.

4. The damaged Motor bus, a 1½ ton vehicle No. 231 MD, was one of a fleet of buses, proprietor Shree Ram Chandra Kali of Midnapur working a regular service on this road. The engine No. 417 G. S., Driver P. J. Martin, received no material damage, the cow catcher requiring to be changed at Khurda Road for straightening. There was no damage to Permanent way.

5. **Description of locality of the accident.**—The road in question is a Grand Trunk Road from Contai to Midnapur in which direction the motor bus was travelling. The road originally crossed the railway alignment at a very sharp angle but to avoid such an acute angled level crossing it is diverted on the west side of the railway line to run parallel to it for a distance of 800' and at about 140' distant before curving through a right angle so as to make a square crossing over the track. The railway embankment is about 5' in height and the road embankment slightly lower, there is therefore very little ramp or grade on either side of the crossing. The road is along an avenue of Siris trees.

6. The railway alignment is perfectly straight and level at the crossing. The nearest curve is 1500' away to the north, the direction from which the engine was travelling. The track is single line standard gauge. The level crossing is No. 81/21-22 and is 'A' class, the road being an important highway. There is a single gate lodge but it is double manned. The gates are of the lift opening collapsible type. The nearest stations are Benapur 1½ miles distant to the north and Narayangarh 4½ miles to the south. The railway embankment has a few trees as shewn along the west side spaced

at considerable intervals. As stated, the road is along an avenue of Siris trees but these are quite thin at the bend of the road to the crossing and do not seriously impair the view. While yet 100 yards from the crossing a motor driver from the south obtains a comparatively clear view of 300 yards of railway track leading to the crossing from the north. Similarly the driver of an approaching train receives a very fair view of the road approach over the crossing from a distance of about 300 yards.

Road traffic over the level crossing though important is not heavy. It appears to average at about 20 motor and 40 other wheeled vehicles during the twelve hours of the day. Rail traffic normally consists of 5 passenger and 4 goods trains each way per day.

7. **Evidence and conclusions.**—This case does not present any complicated features. There are two outstanding facts which contributed to the accident and which combined caused the accident. (a) The lifting barrier gates were raised open to the road (b) neither the driver of the bus nor the driver of the engine saw the other. The amount of material evidence obtainable is very limited. The driver of the bus is dead, the gateman on duty has disappeared and apparently absconded.

8. In regard to (a) the normal position of the gates in daytime is raised *i.e.*, open to the road. They are to be closed only between sunset and sunrise when a train is due or passing or in case of fog, heavy rain and bad visibility on account of the weather.

From the evidence it appears that there must have been heavy local showers about and that one of these was in the vicinity of this level crossing at the time of approach of the light engine from the north and the motor bus from the south. It is impossible to know whether the gateman was present or not. In such rain he would certainly have been inside the gatelodge had he been present. The small verandah would afford no protection. According to rule he should have closed his gates when the rain became heavy. The last train to pass was No. 206 up at 11-30 hrs.. the next train expected was 61 down at 15-20 hrs. He would not therefore be expecting a train or engine at 14-15 hrs. The sub-plate layer who had trollied this section at 13 hrs. had found the gateman then present. The only conclusion is therefore that the gateman had left the gates open and sheltered in his lodge from the heavy rain. He had no reason to expect a train and did not hear the whistle of the light engine. When the accident occurred he at once realised his neglect of duty and decided to abscond without delay.

9. In regard to item (b)—para. 7—this can only be ascribed to heavy rain which obscured visibility.

The driver and engine crew state that they could only look forward through the glasses and could not see past the front of the engine. The driver had authority to travel at mail speed but states that he had slowed down as the view was not clear.

10. No evidence is available from the driver of the bus or from passengers, if any, seated next to him. All that is certain is that there was very heavy rain from the south or west and all the wooden shutters of the sides were up. The driver's seat had a glass window at the side, this also would presumably be closed. Vision through it would necessarily be very poor. It is unlikely that the bus would be travelling at more than about 10 miles per hour round the final curve onto the level crossing, considering the wet road and bad visibility. At a distance of 125′ from the crossing the driver's view of anything on the track passes out of the line of vision through his front glass screen. At this point the light engine must still have been over 100 yards away. Even had he looked through his side glass the heavy rain would prevent the driver seeing any object so far away. From the moment he turned the curve of the road the driver of the bus would have his eyes fixed on the level crossing in front of him to steer a proper course between the gateposts, finding the barriers raised for him.

11. Such are the circumstances in which the motor bus and the light engine approached the level crossing simultaneously. As the front of the motor bus passed over the first rail the engine arrived and crashed into it.

12. The gateman is solely responsible for this accident which was the result of his neglect of duty in not keeping the gates closed the moment the rain became heavy.

13. Considering the comparatively light density of both road and rail traffic it is not easy to make recommendations which will prevent a recurrence of the accident. Provision of electric warning bells and signals could be made but this is scarcely a reasonable demand considering normal conditions of visibility. The existing rules if observed are sufficient to ensure public safety.

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